

AN
ESSAY
ON
BLINDNESS,

In a LETTER to a
PERSON OF DISTINCTION;

Reciting the most interesting Particulars relative to
Persons born Blind, and those who have lost their
Sight.

Being an Enquiry into the Nature of their Ideas,
Knowledge of Sounds, Opinions concerning Mor-
ality and Religion, &c.

Interspersed with several Anecdotes of
SANDERSON, MILTON,
AND OTHERS.

With COPPER-PLATES elucidating Dr. SANDERSON'S
Method of Working
GEOMETRICAL PROBLEMS.
The THIRD EDITION.

Translated from the French of
M. DIDEROT,
Physician to His most Christian MAJESTY,

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B L I N D N E S S

In a LETTER to a
PERSON OF DISTINCTION

By the most illustrious and
renowned Doctor JOHN WILKINSON
Esq.
Being an Essay into the Nature of that
deaf and dumb Condition, and
the Method of curing it.

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G A N D E R S O N M I L T O N
AND OTHERS.

70
With Correct Prints of
Method of Writing
GEOMETRICAL PROBLEMS
THE THIRD EDITION

M. D. C. C. C. C.
Physician to H. R. H. the Prince of Wales
LONDON



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THE
P R E F A C E.

IT is proper the public should be informed of the author's motive for writing the following letter. A foreign physician of some reputation had bills put up at the corners of all the streets at Paris, that on such a day he would give sight to a girl who was born blind. The philosophers were one and all stricken at the confidence with which this kind of prodigy was thus published : and the celebrated Mr. Diderot desired the physician to allow him the favour of being present at

at the operation. It was answered that his presence would, to be sure, be a great honour; however, dreading the philosopher's keen eye, he performed the operation in private; but, at the same time, was willing to make the honour of it as public as possible. On this, the philosopher determined to lay open the fraud, which he did very ingeniously in this letter; a letter stored with such refined ideas, and such profound investigations, that it may well be accounted the standard of human wit and penetration. The impostor stoutly maintained his point, in which he was so seconded by the monastick Phalanx, that, as proves but too commonly the case, he got the better, and the philosopher was sent to Vincennes-castle.

But

P R E F A C E.

But the truth came at length to light, and falsity was exploded with ignominy. Mr. Diderot's letter could not be sufficiently extolled, and, as a complete crown of its glory, Mr. D'Alembert has given a most judicious extract of it in the Encyclopaedia, with observations, omitted here purely to avoid swelling the price of this admirable composition, but which throw great light on the work itself, and may serve as a model to reviewers and others, whose business is to select the plan, ground-work, and essence of books. I have added a few remarks of my own, which arose in me as I perused the book, humbly offering them to the reader's notice.

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LETTER

LETTER

ON THE

BLIND.

MADAM,

IT was no more than what I apprehended, that the blind girl, whom Mr. Reaumur had couched for a cataract, would not inform you of what you was curious to know; but I little thought that it would neither be her fault nor yours. I have, in person, and by means of his best friends, and by paying him many compliments, applied to her benefactor, but without the least success; and the first dressing will be taken off, without your being admitted to see it. Some persons of the first distinction have had the

B

honour

honour of being put on a level with philosophers in this sense: in a word, it was only before some eyes of no consequence he would remove the veil. If you would know why that wonderful operator makes such a secret of experiments, at which you think too great a number of intelligent witnesses cannot be present, my answer is, that the observations of such a celebrated person do not so much stand in need of spectators, whilst making, as of hearers, when made. Thus disappointed, Madam, I betook myself to my first intention, and, being obliged to go without an experiment, in which I saw but little to be gained, either for my own instruction, or yours, but which Mr. Reaumur will doubtless improve to a much higher purpose, I fell to philosophizing with my friend on the important matter which is the object of it. Happy, if you will be pleased to accept the narrative of one of our conversations, instead of the sight which I had too hastily promised you.

On the very day that the Prussian performed

formed the operation of the cataract on Simoneau's daughter, we went to have some talk with the Puifaux man who had been born blind. He is possessed of good solid sense, is known to great numbers of creditable persons, understands something of chemistry, and has attended the courses of botany in the king's garden with tolerable improvement. His father was an eminent professor of philosophy in the university of Paris, and left him such a fortune, as would have very well sufficed for the senses remaining to him; but in his youth he was carried away by love of pleasure, which, with the dishonesty of some others, so reduced his domestic affairs, that he retired into a little town in Provence, from whence every year he takes a journey to Paris, bringing with him liquors of his own distilling, and which give great satisfaction. These, Madam, are circumstances, indeed, not very philosophical; but, on that very account, the fitter to make you conclude, that the person I am speaking of is not imaginary.

It was about five in the afternoon when we came to the blind man's house, where we found him hearing his son read with raised characters: he had not been up above an hour; for you must know that his morning is our evening; carrying on his domestic affairs, and working while others are asleep. At midnight he is free from disturbance himself, and is not troublesome to others. His first care is to put in its place every thing that has been displaced during the day; that his wife, at her getting up, commonly finds the house set to rights. The difficulty which blind persons have in finding things mislaid, makes them love regularity and exactness; and I have observed, that those about them imbibe that quality, whether from the good example set them by the blind, or from an humane concern for them. The blind would, indeed, be very unhappy, without such regard from those about them, nay, we ourselves would feel the want of it. Great services are like large pieces of gold or silver, which we seldom

feldom have occasion to make use of ; but little complaisances are as current cash, which we are continually either receiving or paying away.

This blind man judges very well of symmetries. Symmetry, which, perhaps, is no more than a matter of mere compact among us, is certainly such in many respects, between a blind man, and those who have their sight. A blind man studies, by his touch, that disposition required between the parts of a whole, to entitle it to be called fine ; and thus, at length, attains to a just application of that term. But in saying, *that is fine*, he does not judge ; it is no more than repeating the judgment of those who see ; and is not this the case of three fourths of those who give their verdict on a play, or a book ? Beauty, to a blind man, is but a word when abstracted from utility ; and wanting an organ, how many things are there, the utility of which lies out of his verge ? Are not the blind extremely to be pitied in accounting

nothing fine, unless it be likewise good? How many admirable things are lost to them? The only compensation is, their having ideas of the beautiful, which, if less extensive, are more clear than those of many keen-sighted philosophers, who have composed prolix dissertations on it.

He is continually talking of looking-glasses. You are sensible that he does not know what the word looking-glass means, yet is he never known to put a glass in a wrong light. He expresses himself as sensibly as we on the qualities and the defects of the organ which is wanting in him. If he annexes no idea to the terms he makes use of, yet has he this advantage over most other men, that he never uses them improperly. He discourses so well and so justly of so many things absolutely unknown to him, that his conversation would considerably lessen the weight of that inference which, without knowing, wherefore, we all draw from what passes in ourselves, to what passes within others.

I asked him what he meant by a looking-

ing-glass? “A machine,” answered he,
 “which puts relieve things at a distance
 “from themselves, if when properly placed
 “with regard to it: it is like my hand,
 “which, to feel an object, I must not put
 “on one side of it.” Had Descartes
 been born blind, he might, in my opini-
 on, have hugged himself for such a defini-
 tion. Do but consider, I beg of you,
 what an ingenious combination of ideas it
 implies. This blind man has no other
 object, but by the touch. He knows,
 from the account of others, that objects
 are known by means of the sight, as to
 him by the touch; at least it is the only
 notion he can form of them. He farther
 knows, that there is no seeing one’s own
 face, though it may be touched. He must
 therefore conclude sight to be a kind of
 touch, reaching only to objects different
 from our face, and at a distance from us.
 The touch gives him an idea only of re-
 lief: “therefore,” adds he, “a looking-
 “glass is a machine representing us in re-
 “lief out of ourselves.” How many fa-

mous philosophers have laboured with less subtilty in the pursuit of notions as false? But how surprizing must a looking-glass be to this blind man? How much must his amazement have increased on our informing him, that there are some of those machines which magnify objects, others which, without duplicating them, put them out of their place, bring them nearer, remove them farther, cause them to be perceived, and lay open the most minute parts to the eyes of the naturalists; that some again multiply them by thousands, and that some appear totally to change the figure of objects? Concerning these phænomena, he asked us abundance of strange questions; as, “Whether none, but those called naturalists, saw with the microscope; and “whether astronomers alone saw with the “telescope? Whether the machine which “magnifies objects be larger than that “which lessens them? Whether that “which brings them nearer was shorter “than that which removes them farther “off?” And not conceiving how that other

ther self, which, according to him, the looking-glass represents in relief, should not be tactile, "So," said he, "there's two
 " of our senses set at variance by a little
 " machine : a more perfect machine might
 " possibly reconcile them, without the ob-
 " ject's being ever the more real for that ;
 " and perhaps a third, still more com-
 " plet, and less illusory, would make
 " them vanish, and shew us our mistake."

And what do you take eyes to be ? said M. D.---- "They are," says the blind man,
 " an organ, on which the air has the ef-
 " fect which my stick has on my hand."
 This answer amazed us, and whilst we were looking at one another, wrapped in admiration, "So true is this," continued he, "that on my putting my hand be-
 " tween your eyes and an object, my
 " hand is present to you, but the object
 " absent. It is the same with me when I
 " am seeking one thing with my stick, and
 " meet another."

Madam, only turn to Descartes's Diop-
 tics, and there you will see the phænome-

na of sight illustrated by those of the touch; and optic plates full of men busied in seeing with sticks. Descartes, and all his successors, have not been able to give us clearer ideas of vision; and that great philosopher was, in this respect, no farther superior to the blind man, than a common man who has the use of his eyes.

None of us thought of questioning him concerning painting and writing; but it is evident that there are no questions in which his comparisons would not have borne him out; and I make no doubt but he would have said, that to go about reading or seeing without eyes, was like seeking after a pin with a faggot stick. We only talked to him of those kinds of glasses which exhibit objects in relief, and are both so very similar to, and so very different from, our looking-glasses; but these we perceived rather contradicted than coincided with his idea of a looking-glass; and he was apt to think, that a painter might, perhaps, paint a looking-glass, and that thus it came to represent objects in colours.

We

We afterwards saw him thread very small needles. May I beg the favour of you, Madam, here to suspend your reading, and think how you would go about it, were you in his case? Should no expedient offer itself, I will tell you that of the blind man's. He places the needle's eye transversally between his lips, and in the same direction as his mouth; then, by the help of his tongue and suction, he draws in the thread, which follows his breath, unless it be much too large for the eye; but, in that case, he who has his sight is little better off.

He has a prodigious remembrance of sounds; and the infinite diversity we perceive in faces, he perceives in voices, with numberless minute gradations, which escape us, as not so much concerned to observe them. Those gradations are, to us, like our own face; as of all the men that we have ever seen, he whom we should least recollect, is our very self. We take notice of faces only for better knowing the persons; and that we do not remember our

own is, because we shall never be liable to take ourself for another person, or another for ourself; then, the helps which our senses reciprocally afford to each other, hinder their improvement. It is not here only that I shall have occasion to make this remark.

On this head our blind man said, "That he should think himself a pitiable object in wanting those advantages which we enjoy; and that he should have been apt to consider us as superior intelligences, had he not a hundred times found us very much inferior to him in other respects." This reflection gave rise to another in us. This blind man, said we, values himself as much, and perhaps more, than we who see. Why then, if the brute reasons, and it is scarce to be doubted, why, on weighing its advantages over man as better known to it than those of man over it, should it not make a like inference? He has arms, perhaps says the gnat, but I have wings. If he has weapons, says the lion, have we not claws?





claws? The elephant will look on us as insects; and all the animals, very readily allowing us a reason, with which we should at the same time stand in great need of their instinct, will set up to be endued with an instinct, by means of which they do very well without our reason.

One of our company asked the blind man, whether he should not be very glad to have eyes? “ Were it not for curiosity,” said he, “ I would full as lieve have long arms. My hands, I think, would inform me better of what is doing in the moon, than your eyes or your telescopes. Besides, the eyes sooner cease to see, than the hands to touch; that to improve the organ which I have, would be as good as to give me that which is wanting in me.”

This blind man points with such exactness at the place whence a noise comes, that I make no doubt the blind may, by practice, become very dexterous, and very dangerous. Here is a passage which will shew you, how imprudent it would be to stand

stand the throwing of a stone, or discharging of a pistol, by him, were he in the least used to that weapon. He had, in his youth, a quarrel with one of his brothers, who came off but badly. Provoked at some insulting language, he laid hold of the first object which came to hand, threw it at him, and hit him directly on the forehead, so as to lay him flat on the ground.

This, with some other adventures of the like kind, caused him to be brought before the police. The blind are proof against all those ensigns of power which make such strong impressions on us. He made his appearance before the magistrate as his equal, and without being in the least intimidated by any of his threats. "What would you do to me?" said he, to M. Herault. "I will commit you to the dungeon," answered the magistrate. "As to that, Sir," replied the blind man, "I have been in one these twenty-five years." There was an answer, Madam; and what a text for one, who is so fond of moralizing,

moralizing, as your humble servant ! We go out of life, as from a splendid entertainment ; the blind man, as out of a dungeon. We may possibly have more pleasure in living than he, but certainly death to him is a much less disagreeable affair.

The blind man judges of the nearness of fire by the degrees of heat ; of the fullness of vessels, from the noise made by liquors which he decants into them ; and of the proximity of bodies, by the action of the air on his face. So sensible is he of the least change in the atmosphere, that he can distinguish a street from a turn-again. He has a wonderful faculty in determining the weights of bodies, and the capacities of vessels ; and of his arms he has made such exact ballances, and his fingers are compasses so well known to him from numberless experiments, that in this kind of statics, I will always wager on our blind man's head against twenty persons, with all their eyes about them. The polish of bodies has scarce fewer gradations
to

to him than the sound of voices ; and there is no danger of his mistaking another for his wife, unless he was to be a gainer by the exchange. Yet is it very probable, that among blind people, wives would be in common, or their laws against the adulterers must be severe indeed ; so very easy would it be for wives to deceive their husbands, by concerting a sign with their gallants.

He judges of beauty by the touch ; in this, however, there is no great mystery ; but what is not so easy to be comprehended is, that he includes in this conjecture, pronunciation, and the sound of the voice. I wish anatomists would inform us, whether there is any relation between the parts of the mouth and the palate, and the external form of the face. He turns very neatly, does pretty pieces of needle-work, levels with a square, and makes up and takes to pieces common machines. He is so far skilled in music, as to perform a piece after being told the notes, and their value. He estimates the duration of time much
more

more precisely than we, by the succession of actions and thoughts. A smooth skin, firm flesh, an elegant shape, a sweet breath, a mellow voice, a graceful pronunciation, are qualities on which he sets a great value.

He married to have eyes of his own, which superseded a former intention of taking into partnership with him a deaf man, to find eyes, as he, in return, would contribute ears. I could not sufficiently wonder at his singular address in a great many things; and on our expressing our surprize, "I perceive, gentlemen," says he, "that you are not blind: you are astonished at what I do, and why not as much at my speaking?" I believe there is more philosophy in this answer, than what he himself dreamed of. The facility with which we all are brought to speak, is not a little surprizing. It is only by a series of ingenious, and profound combinations of the analogies observed between objects out of the verge of sense, and the ideas they raise, that we come to annex

annex an idea to many terms not represented by sensible objects ; and, consequently, learning to speak should be more difficult to a blind man than to any other, the number of objects, without the verge of his senses, being much greater, and thus his field for comparing and combining, much more limited. How, for instance, can the word physiognomy imprint itself on his memory ? It is a kind of comeliness, consisting in objects so little sensible to a blind person, that for want of its being sufficiently so even to us who see, we should be at no little loss to explain very precisely what physiognomy is. If the eyes be the parts in which it chiefly resides, then the touch can give us no information ; and, besides, what does a blind man know of dead eyes, languishing eyes, brisk eyes, expressive eyes, &c. ?

I infer from thence, that we unquestionably derive great advantages from the concurrence of our senses, and our organs ; still would it be quite another thing, did we use them separately, and never employ
two,

two, where one alone would suffice. To add the touch to the sight, when our eyes will do the business, is like putting to a carriage with two horses, already sufficiently stout, a third, which will draw one way, while the others draw another.

As to me it has always been very clear, that the state of our organs and our senses has a great influence on our metaphysics and our morality; and that our most intellectual ideas, in a great measure, depend on the conformation and texture of our bodies, I put some questions to the blind man concerning the vices and virtues. I immediately perceived that he had a violent aversion to theft; possibly for two reasons, it being an easy matter to steal from him without his perceiving it; and still more, perhaps, that he could be immediately seen, were he to go about filching. Not that he is at any loss to secure himself against that sense which he knows we have above him, or that he is but awkward at hiding what he might steal. Modestly

deftly he makes no great account of. He would fcarce underftand the ufe of apparel, were it not for the weather; and he frankly owns, he cannot think why one part of the body is covered more than another; and ftill lefs, how, among thofe parts, the preference is given to fome, which, from their ufe, and the indispositions to which they are fubject, ought rather to be kept free. Though living in an age when philofophy has rid us of a great number of prejudices, I don't think we fhall ever go fuch a length as to fet afide the prerogatives of modetty, fo abfolutely as this blind man. Diogenes would have been no philofopher in his account.

As of all the external figns which raife our pity and ideas of pain, the blind are affected only by complaint, I have, in general, no high thoughts of their fymathy and tendernefs. What difference is there to a blind man between him who is making water, and him whose blood is gushing out, but makes no complaint? And we
ourselves;

ourselves; where is our compassion, when distance, or the smallness of objects, render them the same to us, as the want of sight does to the blind? So near a-kin are our virtues to our manner of sensation, and the degree in which external things affect us! Nay, I make no doubt but that, setting the law aside, many could sooner kill a man at such a distance as to seem no bigger than a swallow, than cut an ox's throat with their own hands. We pity a horse in pain, and we make nothing of crushing an ant; and still is it not by the same principle that we are moved? Ah, Madam, how different is the morality of the blind from ours? How different would that of a deaf man likewise be from his? And how deficient, to say nothing more, would our morality appear to one with a sense more than we have?

Our metaphysics and theirs agree no better. How many of their principles are mere absurdities to us, and *vice versa*? Concerning this, I might enter into a detail, which I am pretty certain would entertain

ertain you, but which a set of exceptious men exclaim against, as profaneness and infidelity, as if it was in my power to make the blind perceive things otherwise than they do. I shall therefore only observe one thing, and that, I believe, every one must allow: it is, that the mighty argument drawn from the wonders of nature, is a very weak one to the blind. The facility with which we, as it were, create fresh objects, by means of a small glass, is something more incomprehensible to them than constellations, from the sight of which they are totally excluded. That lucid globe, moving from east to west, astonishes them less than a small fire, which they are able to make greater or less: seeing matter in a much more abstract manner than we, they are less indisposed to believe that it thinks.

A man who has seen but a day or two must, among a blind people, either be silent, or be looked upon as brain-sick. He would be every day acquainting them with some new mystery, which would be such
only

only to them, and thus free-thinkers would oppose it tooth and nail. Might not the champions of religion greatly avail themselves of such a stubborn infidelity, which, however just in some respects, is yet so very ill grounded? Be pleased only to dwell a little upon this supposition. It will bring to your mind, under a borrowed imagery, the history and persecutions of those whose misfortune it has been to find out truth in an age of darkness, and who imprudently made it their business to spread it among their blind contemporaries; and their most envenomed enemies were those, who, from their class and education, one would have thought least remote from such opinions.

So much for the morality and metaphysics of the blind: I proceed to things less important, but more nearly connected with the end of the various observations every where made here since the Prussian's arrival.

Question I. How can one born blind form to himself ideas of figures?

I believe

I believe that the motions of his body, the successive existence of his hands in several places, the continuous feeling of a body passing between his fingers, give him the notion of direction. In sliding them along a thread tightly stretched, he has the idea of a straight line; in following the bending of a slack thread, he gets that of a curve line: he has, by repeated experiments of the touch, a remembrance of sensations felt in different points. These sensations, or points, he is able to combine, and form figures by them. A straight line is to a blind man, who is no geometrician, only the remembrance of a series of sensations placed in the direction of a tight thread; a curve line the remembrance of a series of tactile sensations referred to the surface of some solid body, concave or convex. Study rectifies the geometrician's notions of these lines by the proprieties he discovers in them; but he who was born blind, whether he understands geometry, or not, refers all to his fingers ends. We combine coloured

points, he combines only palpable points ; or, to speak more precisely, only such tactile sensations which he remembers. The operations in his head have little analogy with ours ; he cannot imagine, as imagination implies a coloured ground and points detached from that ground, by supposing them differing in colour from that ground : make those points of the same colour as the ground, and they are instantly lost in it, and the figure disappears : at least, that is the case in my imagination ; and I suppose imaginations are alike. Thus, when I purpose to perceive in my head a straight line otherwise than by its properties, my first step is to spread in it a white canvass, detaching from the ground a continuous series of black points in the like direction. The stronger the colours of the ground and points, the clearer my perception of the points. To view in my imagination a figure of a colour very nearly bordering on that of the ground, puts me to no less trouble than if out of myself and on a canvass.

C

You

You see then, Madam, that laws might be given for imagining with ease various objects, variously coloured; but such laws are by no means calculated for one born blind, who not being able to colour, and consequently not to imagine, in our way, remembers only such sensations as are derived from the touch; and which he refers to different points, places and distances, and of which he forms figures. So certain is it that there is no figuring in fancy without colouring, that if little balls, to the colour and matter of which we are strangers, be given us to touch in the dark, we shall immediately suppose them white or black, or of some other colour; and that if we do not annex a colour to them, we, like the blind man, shall have the remembrance only of little sensations excited at our fingers ends, and such as little round bodies may occasion. If this remembrance be very fleeting in us, if we have but little conception how one born blind fixes, recalls, and combines the sensations of the touch, it is owing to the custom we
derive

derive from our eyes, of performing every thing in our imagination with colours. It has, however, been my own case, under the agitation of a violent passion, to feel a thrilling throughout one of my hands, and the impression of bodies, which it was some time since I had touched, renewed as strongly as if still actually under my touch: the limits of the sensation likewise precisely corresponding with those absent bodies. Though sensation be of itself indivisible, it takes up, if I may be allowed the term, a large space, which the person blind from his birth can increase or contract by thought, enlarging or diminishing the part affected. Thus he composes points, surfaces, and solids: he will even have a solid large as the terraqueous globe, by supposing his fingers ends as large as the globe, and every where in length, breadth, and depth, taken up by the sensation.

I do not know any thing which better demonstrates the reality of internal sensation, than this faculty, so weak in us, but

so strong in those who are born blind, of feeling or calling to mind the sensation of bodies, even when absent, and no longer acting on us. We cannot bring one born blind to understand how imagination exhibits absent objects to us as if present; but we easily perceive in us the same faculty of feeling at the fingers ends a body when no longer there, as in one born blind. In order to this, squeeze your fore-finger against your thumb, shut your eyes, spread your fingers, and immediately after they are separated, look into yourself, and tell me, whether the sensation does not last a considerable time after the compression has ceased? whether if, during the compression, your soul appears to you to be rather more in your head than at your fingers ends? and whether this compression does not, by the space which the sensation fills, give you the idea of a surface? We distinguish the presence of beings out of us, from the imagery of them in our imagination, only through the force or weakness of the impression.

So

So he, who is born blind, discerns the sensation from the real presence of an object at his fingers ends, only by the force or weakness of that very sensation. Should a philosopher, who has been blind and deaf from his birth, ever make a man in imitation of that of Descartes, I dare affirm, Madam, that he will place the soul at the fingers ends; as from thence deriving his principal sensations, and all his lights. And who will put him in mind, that his head is the residence of his thoughts? If the labours of imagination impair our brain, it is because our effort in imagining is pretty similar to that which we exert in perceiving very near or very small objects. But it will not be so with him who has been blind and deaf from his birth: the sensations which he has derived from the touch will be, as it were, the mould of all his ideas; and I should not be surprized that, after a deep and close meditation, his finger should be as much tired as our head. It would give me no apprehension, were a philosopher to object

to him, that the nerves are the causes of our sensations, and that all nerves have their origin in the brain. Were these two propositions fully demonstrated, which is very far from being the case, especially the former, an exposition of all the dreams of naturalists on this head, would be sufficient to confirm him in his opinion.

But if the imagination of a blind person be no more than the faculty of calling to mind, and combining sensations of palpable points; and that of a man who sees, the faculty of combining and calling to mind visible or coloured points: the person born blind consequently perceives things in a much more abstract manner than we; and in questions merely speculative, he is, perhaps, less liable to be deceived. For abstraction is only separating the sensible qualities of bodies, either from one another, or from the body itself in which they are inherent; and from this being wrong or improper, springs error, wrong in metaphysical questions, and improper in physico-mathematical questions.

tions. A way, in which one can scarce avoid being mistaken in metaphysics, is not sufficiently simplifying the objects under investigation; and an infallible secret for coming to false conclusions in physico-mathematics, is to suppose them less compounded than they are.

There is a kind of abstraction, of which so very few are capable, that it seems reserved to pure intelligences: the reducing every thing to numerical unities. It must be allowed, that the results of this geometry would be very exact, and its formulas very general, there being no objects either actually existing or possible, which these simple unities could not represent, by points, lines, surfaces, solids, thoughts, ideas, sensations, &c. and, if this should prove to be the foundation of Pythagoras's doctrine, he might be said to have failed in his plan, his mode of philosophizing being too much above us, and too near that of the Supreme Being, who, according to the ingenious expression of

an English geometrician, is perpetually geometrifying in the universe.

Unity, pure and simple, is too vague and general a symbol for us. Our senses bring us back to signs more analogous to the extent of our intellects, and the conformation of our organs. We have even brought those signs to be in common among us, and to serve, as it were, for the staple, in the mutual commerce of our ideas: some we have appointed for the eye, as characters; some for the ear, as articulate sounds; but for the touch we have none, though there is a proper way of speaking to that sense, and getting answers from it. The want of this language precludes all conversation between us and those who are born deaf, blind, and dumb. They grow up, but still in a state of imbecility; whereas, they might, perhaps, acquire ideas, were they, from their childhood, trained in a fixed, determinate, constant, and uniform manner to understand us: in a word, by tracing on their hand the same characters, which
we

we delineate on paper, with the same signification unalterably annexed to them.

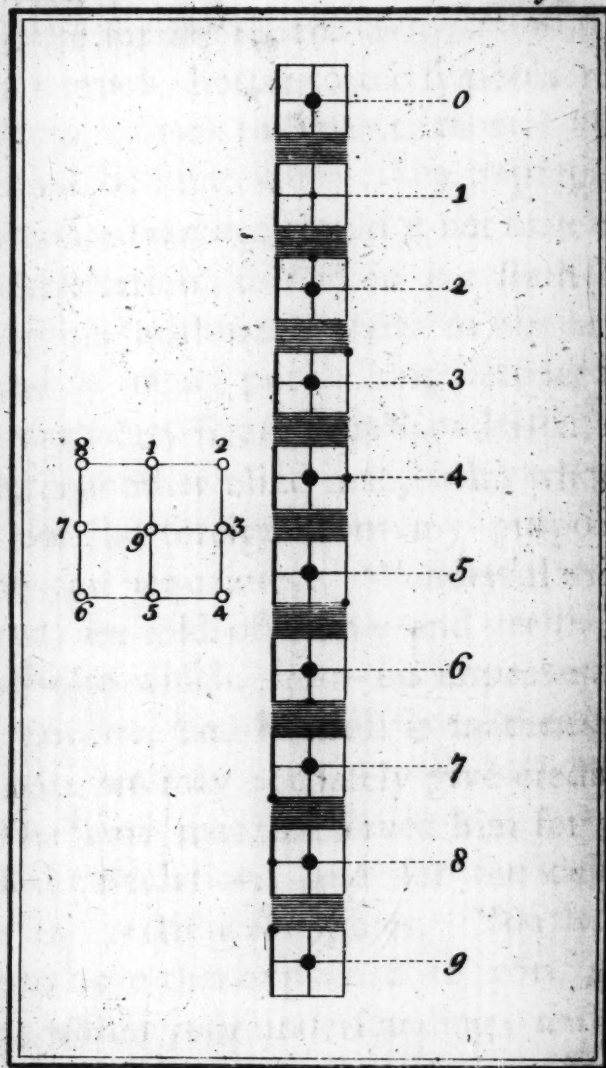
Now, Madam, does not this language appear to you as convenient as another; and is it not even ready invented? And would you take upon you to affirm, that you never have been brought to understand any thing in the like manner? All that remains then is to fix it, and make a grammar and dictionaries of it, should the expression, by the common characters of writing, be thought too slow for this purpose.

There are three avenues for knowledge; but one, from the want of signs, is kept barricaded: had the two others been neglected, we should be little better than brutes; as the touch understands only by compression, so would it have been the only means of speaking to the ear. Madam, it is only the want of one sense, can make us thoroughly acquainted with the advantages of the symbols, appointed for those which we enjoy; and what a consolation would it be to those, whose misfor-

tune it is to be deaf, blind, and dumb, or who should lose those three senses by any accident, were there a clear and precise language for the touch.

It is much shorter to use symbols ready invented, than to invent them, which yet must be done when taken unprepared. What an advantage would it not have been for Saunderson, to find in his sixth year a tangible arithmetic ready to his hands, instead of being put to contrive one when he was twenty-five. This Saunderson, Madam, is another blind man, with whom it will not be foreign from my purpose to make you acquainted. Wonderful things, indeed, are told of him; and yet there is not one to which, from his improvements in literature, and his skill in mathematical sciences, we may not safely give credit.

The same machine served him for algebraical calculations, and for the description of rectilineal figures. You would like to have this explained to you, did it come within your understanding; and now you shall see that it supposes no farther know-



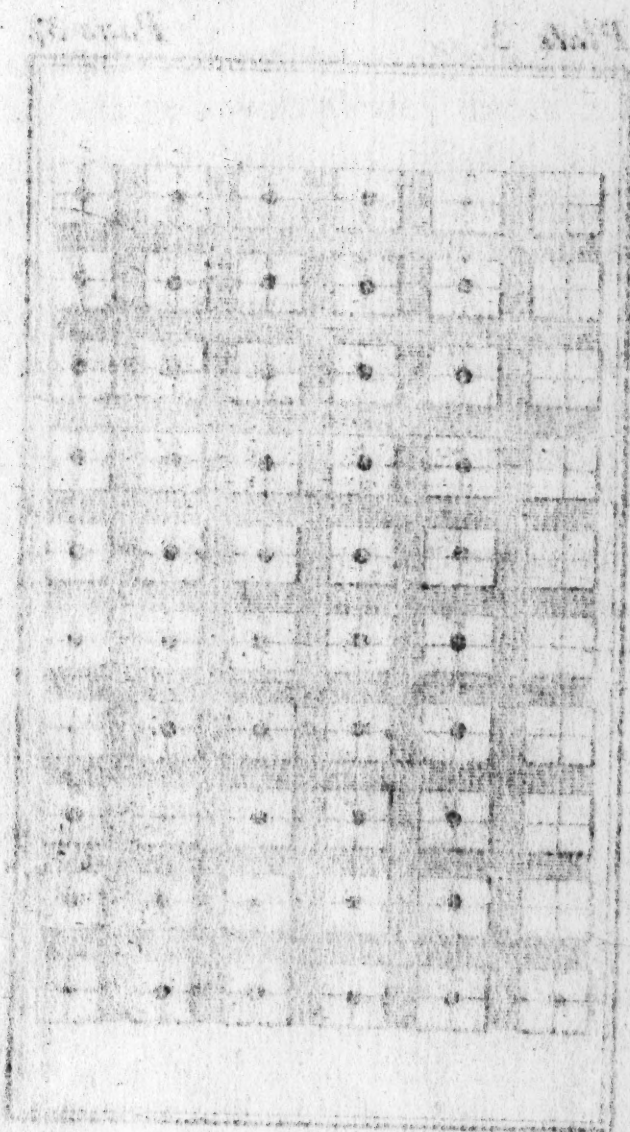
knowledge than what you are mistress of, and that it would be very useful to you, should you ever take it into your head to work long calculations *by feeling*.

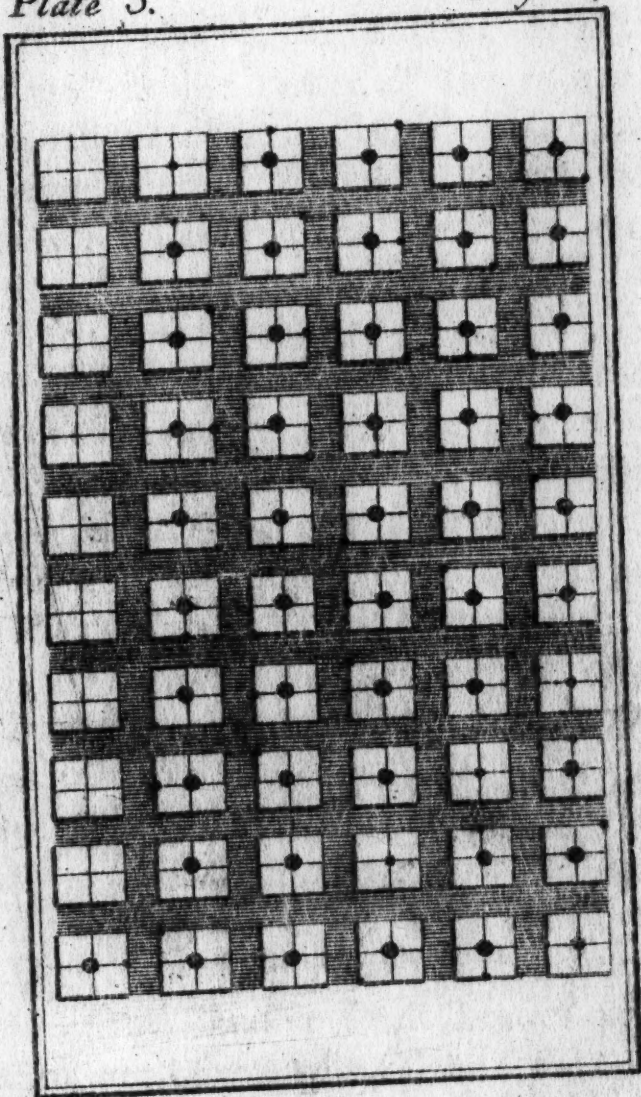
Suppose a square, as Plate II. Divide it into four equal parts by perpendicular lines at the sides, so as to form the nine points, 1, 2, 3, 4, 5, 6, 7, 8, 9. In this square are nine holes, capable of admitting two kinds of pins, all of the same length and bigness, except the heads of some being a little bigger than others.

The large headed pins were never placed but in the center of the square; and the small headed always on the sides, except only in the single case of a nought, and this was marked by a large headed pin placed in the center of the little square, without any other pin on the sides. The cypher 1, was represented by a small headed pin in the center of the square, without any other pin on the sides. Cypher 2, by a large headed pin placed in the center of the square, and a small headed pin placed on one of the sides at

point 1. Cypher 3, by a large headed pin placed in the center of the square, and a small headed pin placed on one of the sides at point 2. Cypher 4, by a large headed pin placed in the center of the square, and by a small headed pin placed on one of the sides at point 3. Cypher 5, by a large headed pin in the center of the square, and a small headed one in one of the sides at point 4. Cypher 6, by a large headed pin in the center of the square, and a small headed pin on one of the sides at point 5. Cypher 7, by a large headed pin placed in the center of the square, and a small headed pin placed on one of the sides at point 6. Cypher 8, by a large headed pin placed in the center of the square, and a small headed pin placed on one of the sides at point 7. Cypher 9, by a large headed pin placed in the center of the square, and a small headed pin placed on one of the sides of the square at point 8.

Here are ten different expressions for the touch, each answering to one of our ten arith-





arithmetical characters. Now fancy a table as large as you please; divide it into little squares horizontally disposed, and separated one from another at the same distance, as in Plate III. and this gives you Saunderson's machine:

You readily conceive, that there are no numbers which may not be written on that table; and, consequently, no arithmetical operation but what may be performed by it.

Let it be proposed, for instance, to find the sum of the nine following numbers.

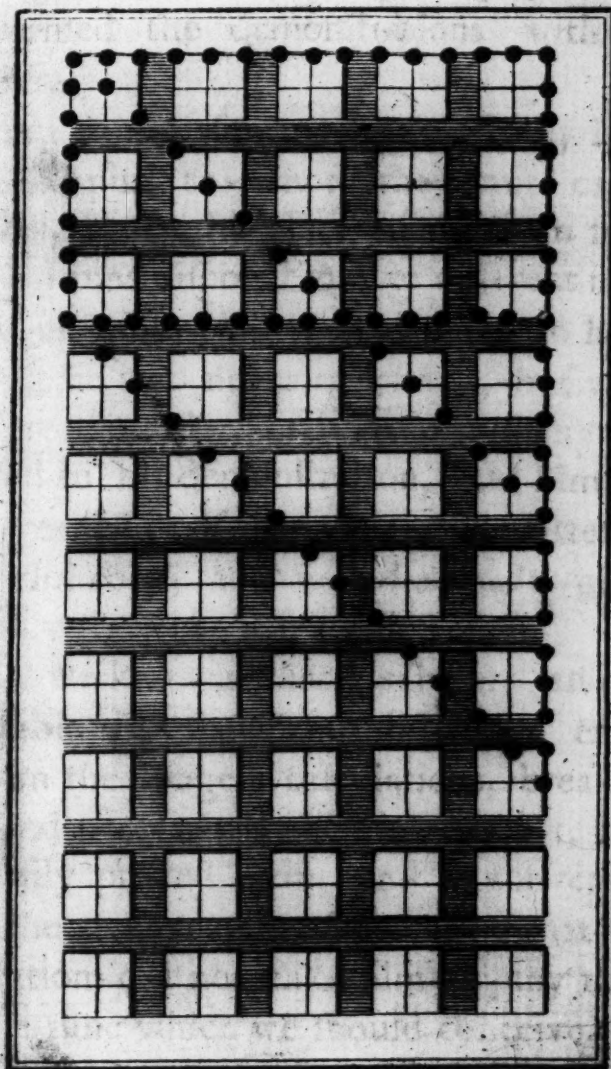
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9
6	7	8	9	0
7	8	9	0	1
8	9	0	1	2
9	0	1	2	3

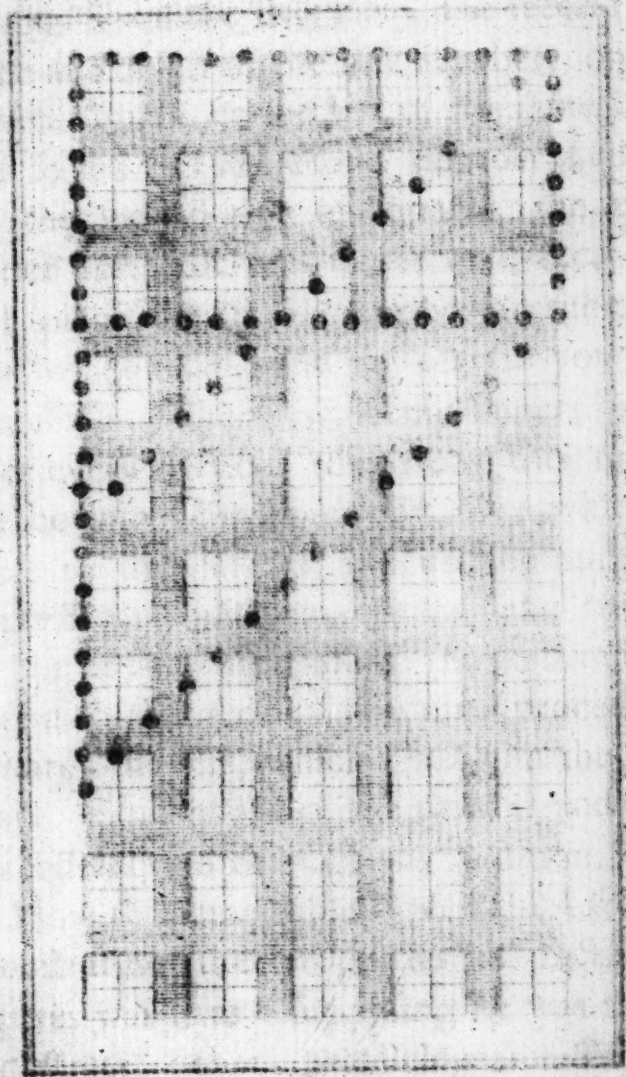
I write them on the table as they are named to me. The first cypher at the left

left of the first number, on the first square to the left of the first line; the second cypher at the left of the first number, on the second square, at the left of the same line; and so on. The second number I place on the second row of squares, the units under units, the tens under tens, &c.

I place the third number on the third row of squares, and so on, as you see, Plate III. Then, with my fingers going over every vertical row from the top to the bottom, beginning by that which is most to my left, I add up the numbers expressed in that row, writing the surplus of the tens at the end of the column. I go on to the second column, proceeding towards the left, which I work in the same way. From that to the third; and thus successively go through my addition.

How the same table served him for demonstrating the properties of rectilineal figures was thus: supposing he was to demonstrate, that parallelograms of the like base and height have equal surfaces; he placed his pins as you see, Plate IV. annexing





nexing names to the angular points, and performed the demonstrations with his fingers.

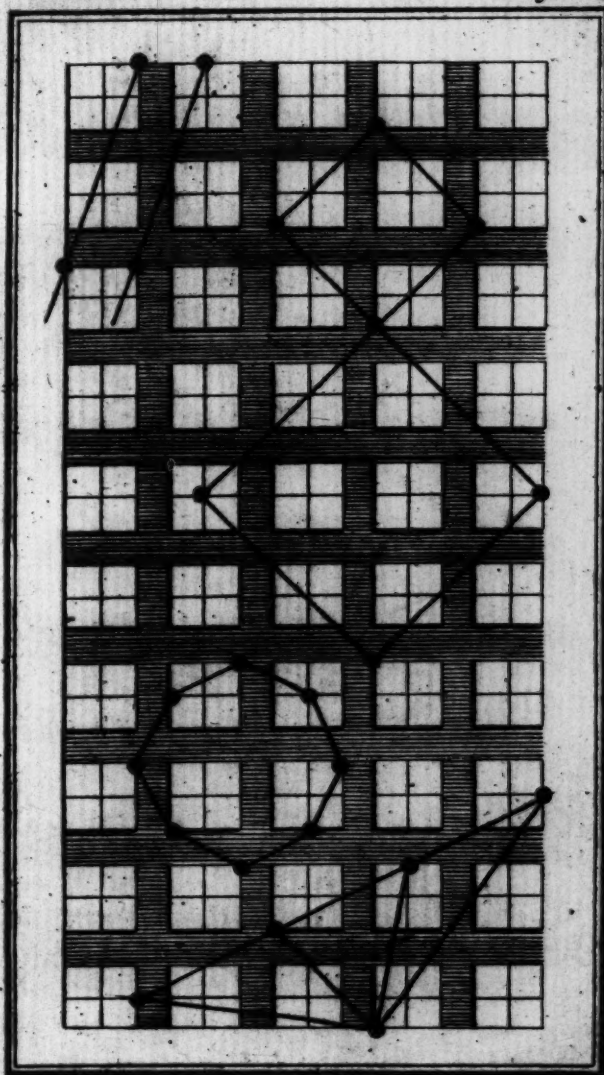
Had Saunderson made use of only large headed pins to denote the limits of his figures, he could place round them small headed pins disposed in nine different manners, all quite plain and familiar to him; so that he was never at a stand, but when the great number of angular points to be named in his demonstration, laid him under a necessity of recurring to the letters of the alphabet; and how he made use of them, we are not informed.

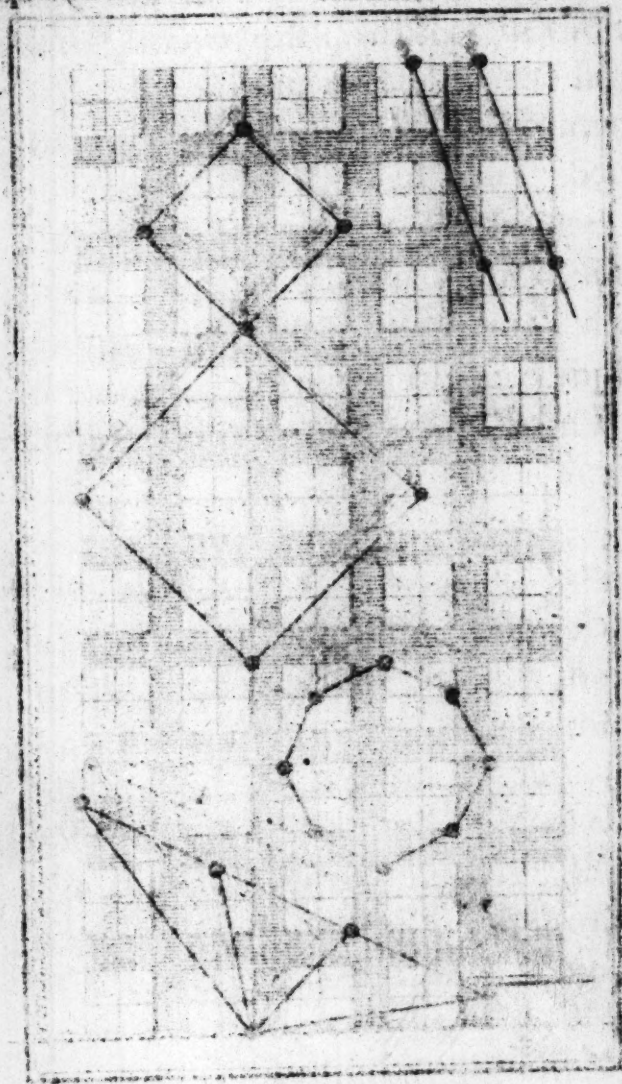
All we know is, that his fingers ran over his table with surprizing dispatch; entering on the longest calculations, breaking off, and perceiving when he was out, that he easily proved them, and so convenient was the arrangement of his table, that this operation did not take him up any thing of the time which we should conceive.

This arrangement consisted in placing large headed pins in the center of all the squares; after which, all he had to do,

do, was determining their value by the small headed pins, except in the case of a nought. Then, instead of the large headed pin, he placed in the center of the square, a small headed one. Sometimes, instead of forming a whole line with his pins, he only placed them at all the angular, or intersecting points, with filken threads round them, which completed the limits of his figures. See Plate V.

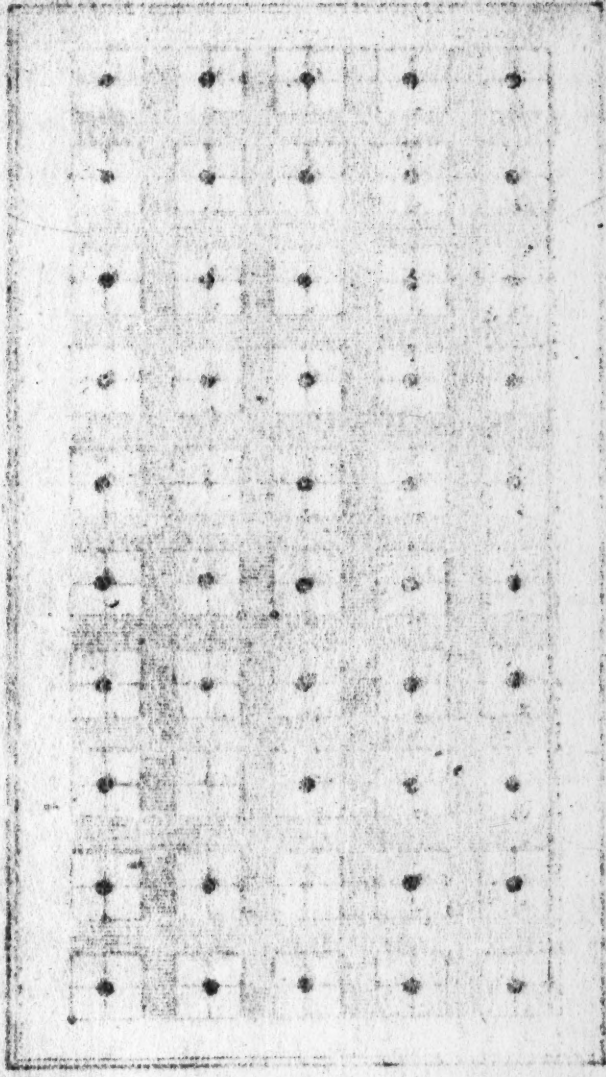
He has left some other machines, which made the study of geometry easier to him. His particular way of using them is not known; and, perhaps, the finding it out would require more sagacity than to solve a problem of integral calculation. I wish some geometrician would find out what use he made of four solid pieces of wood in the form of rectangular parallelopipedes, each eleven inches in length, to a breadth of five and a half, and little more than half an inch in thickness, with the two thick opposite surfaces divided into small squares, like that of the abacus, before described, with this difference, that they were perforated

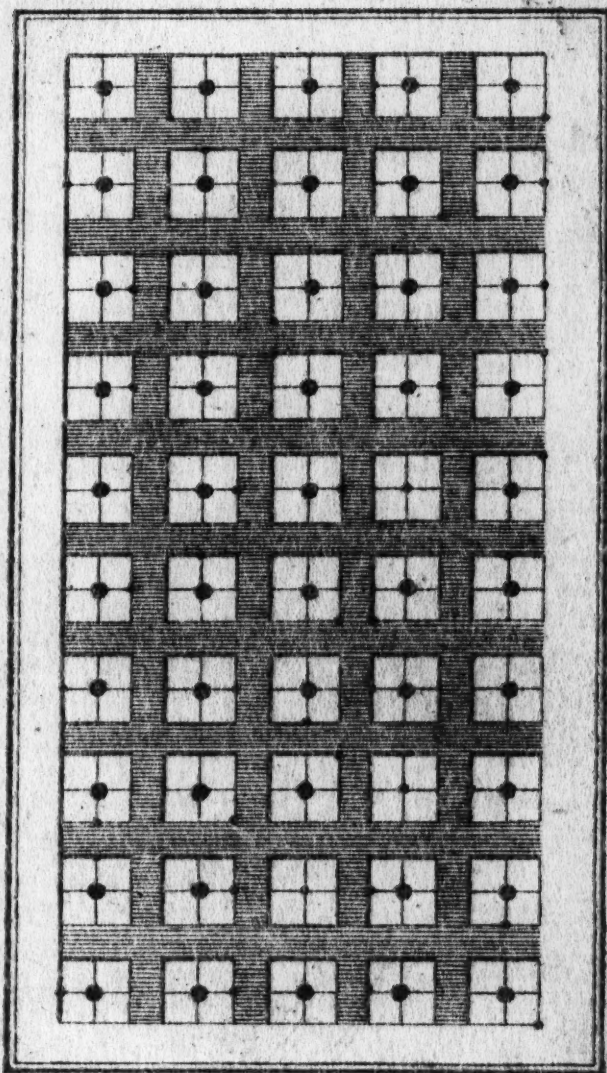




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rated only in some places where the pins were thrust in up to the head. Every surface represented nine small arithmetical tables, each of ten numbers; and each of those ten numbers was composed of ten cyphers. Plate VI. exhibits one of these little tables, with its numbers.

9	4	0	8	4
2	4	1	8	6
4	1	7	9	2
5	4	2	8	4
6	3	9	8	6
7	1	8	8	0
7	8	5	6	8
8	4	3	5	8
8	9	4	6	4
9	4	0	3	0

He wrote *The Elements of Geometry*, a very complete work in its kind, and which bears no other marks of his blindness, than the singularity of some demonstrations, which a man, with his eyes, would perhaps not have hit on. He first found
out

out the division of the cube into six equal pyramids, with their summits in the center of the cube, and their bases each of its faces. It is used in a very plain demonstration, to show that every pyramid is the third of a prism of the same base and height.

His own taste led him to the study of the mathematics, and the smallness of his fortune, but chiefly the encouragement of his friends, put him on holding public lectures. They made no question of his succeeding beyond his hopes, by his wonderful facility in making himself understood. Saunderson, indeed, used to speak to his pupils as if they had lost their sight; but that blind man, who speaks so as to be clearly understood by the blind, must go a great way with those who have their sight: it is a telescope the more. They who have written his life say, that he abounded in happy expressions; and that is very probable. But, perhaps, you will ask me, what do you mean by happy expressions? I answer, Madam, that they
are

are such which are proper to one sense, as to the touch, and, at the same time, metaphorical to another sense, as the sight; a circumstance, from which the person spoken to receives a double light, the real and direct light of the expression, and the reflected light of the metaphor. It is evident, that on these occasions, Saunderfon understood himself only by halves, as perceiving only half the ideas annexed to the terms he used. But who is not now and then in the like case? many a smart jest shall come from idiots, and persons of the best sense drop a silly thing without either being aware of it.

I have observed the want of words produce the like effect in foreigners, who, in our language, are obliged to say every thing in very few words, some of which they unknowingly place very happily. ~~But~~ every language being to writers of a lively fancy deficient in fit words, they are in the same case as foreigners of wit; the situations invented by them, the delicate gradations
3 they

they perceive in characters, the natural pictures which they draw, are continually leading them from the common ways of speaking into terms and phrases, which never fail to charm, when neither obscure nor affected; and these faults are dealt with according to the reader's own wit, and his little acquaintance with the language. Hence it is that, of all French writers, M. de M—— is best liked by the English; and Tacitus, of all the classics, bears the bell among *thinkers*: they do not attend to the licences of the style, it is only the truth of the expression which strikes them.

Saunderson was professor of mathematics at the university of Cambridge. He read lectures on optics, the nature of light and colours; he explained the theory of vision, the effects of glasses, the phenomena of the rainbow, and several other points relating to sight, and its organ.

The marvellous of these things, Madam, will be found considerably to abate, on your taking into consideration, that there

there are three things to be distinguished in every physico-geometrical question; the phænomenon to be explained, the geometer's suppositions, and the calculation resulting from the suppositions. Now, it is manifest, that to a blind person, how great soever his penetration be, the phænomena of light and of colours are unknown. The suppositions he will understand, as all of them relate to palpable causes; but the geometer's reason for preferring them to others, will be out of his verge, as in order to that, he must be able to compare the suppositions themselves with the phænomena: therefore, the blind man takes the suppositions for what they are given him; a ray of light for an elastic and fine thread, or for a series of minute bodies striking our eyes with incredible velocity; and he calculates accordingly. The transition from physics to geometry is now got over, and the question becomes simply mathematical.

But what are we to think of the results of the calculation? 1. That the coming at them;

them is sometimes extremely difficult, and that it would be to little purpose, that a naturalist could form the most plausible hypotheses, were he not able to verify them by geometry: accordingly, the greatest natural philosophers, as Galileo, Descartes, and Newton, were great geometers. 2. That these results are more or less certain, as the hypotheses on which they are built, are more or less complicated. When the calculation is founded on a simple hypothesis, the conclusions acquire the force of geometrical demonstrations. When the suppositions are multifarious, the probability of each hypothesis being true diminishes in proportion to the number of the hypotheses; but, on the other hand, increases from the little probability, that so many false hypotheses would exactly correct each other, and produce a result confirmed by the phenomena. This would be like an addition, the result of which was right, though the partial sum of the numbers added had been all miscounted. The possibility of such an
opera-

operation cannot be denied; but, at the same time, you see, that it would very seldom prove so. The more numbers are to be added, the greater the probability of a mistake in the addition of each; but this probability is likewise lessened, if the result of the operation be right: so that there is a number of hypotheses, the certainty resulting from which would be the least possible. If I make A, plus B, plus C, equal to 50, am I to conclude from 50 being the real quantity of the phænomena that the suppositions represented by the letters A, B, C, are true, there being numberless ways of taking from one of those two letters, and adding to the other, and 50 to prove always the result? But the case of three combined hypotheses is, perhaps, one of the most disfavoured.

One advantage of calculation, which I must not omit, is, that the contrariety found between the result and the phænomenon excludes false hypotheses. A naturalist, to find the curve formed by a ray of light in the atmosphere, is obliged to regulate

regulate himself by the density of the strata of the air, the law of refraction, the nature and figure of the luminous corpuscle, and, perhaps, by other essential elements which he does not bring into account, either as voluntarily neglecting them, or being unknown to him. At length he determines the curvature of the ray. If it be otherwise in nature, than his calculation makes it, his suppositions are deficient or false; if the determination agrees with the natural curvature of the ray, it follows either, that some suppositions have corrected others, or that they are all exact: but which of the two, he knows not; yet, that is the certitude to which he can attain.

I have carefully perused Saunderson's *Elements of Algebra*, in hopes of meeting with what I was desirous of knowing from those who familiarly conversed with him, and who have made us acquainted with some particulars of his life; but my curiosity has been disappointed, and I thought that elements of geometry from him would have

have been a work both more singular in itself, and much more useful to us. We should there have been let into his definitions of point, line, surface, solid, angle, intersections of lines and planes, in which I make no question but he would have proceeded on principles of very abstract metaphysics, and near a-kin to that of the idealists. Idealists, Madam, are those philosophers who, being conscious only of their existence and a succession of internal sensations, admit nothing else. A system of such extravagancy, that I should think it must have been the offspring of blindness itself; and yet, to the disgrace of the human mind and of philosophy, is the most difficult to combat, though the most absurd. Dr. Berkeley, bishop of Cloine, in Ireland, has set it forth with great candour and perspicuity, in three dialogues. It were to be wished, that the author of the *Essay on our Knowledge*, would take this work into examination; he would there find matter for useful, agreeable, and ingenious observations; for

D

such

such as, in a word, no person has a better talent. Idealism deserves very well to be reported to him; and this hypothesis is as a double incentive for him, its singularity, and much more the difficulty of refuting its principles, they being precisely the same as those of Berkeley. According to both, and according to reason, the terms, essence, matter, substance, agent, &c. of themselves, convey very little light to the mind. Besides, as the author of *The Essay on the Origin of Human Knowledge* judiciously observes, whether we ascend up to the heavens, or go down into the abysses of the earth, we never go out of ourselves, and what we perceive is only our own thoughts: now this is the very result of Berkeley's first dialogue, and the foundation of his whole system. Would it not highly delight you, Madam, to see two enemies engaged, whose weapons are so much alike? If either got the better, it must be he who should manage them with the greater dexterity; and the author of *The Essay on the Origin of Human Knowledge*

ledge

ledge has lately, in a treatise on systems, given fresh proofs of his adroitness, and how much he is to be redoubted by systematics.

Here, you will say, this is quite losing sight of the blind. True, Madam; but you must be so good as to allow me all these digressions. I promised you a conversation, and, without this indulgence, I cannot keep my word.

I have perused, with the utmost stretch of my attention, what Saunderson has said concerning infinitude: and I can assure you, that he had such very just and very clear ideas on this head, that, in his account, most of our infinitarians would have been looked on but as blind. - You yourself shall be judge: though this matter be somewhat difficult, and a little beyond your mathematical knowledge, I trust to bring it within your compass, and initiate you into this infinitesimal logic.

This celebrated blind man proves that touch, when improved by exercise, may become more precise than sight; for, in

handling a series of medals, he could distinguish the genuine from the spurious *, though the imitation was such as might have deceived a clear-sighted connoisseur; and he judged of the exactness of a mathematical instrument, by drawing his fingers ends along its divisions. These are certainly things of another kind of difficulty, than forming a judgment by the touch of the likeness of a bust to the person it represents. This shews that a blind people might have sculptors, and put statues to the same use as among us, to perpetuate the memory of glorious actions, and of persons dear to them; and, in my opinion, feeling such statues would give them a more lively pleasure than we have in seeing them. What a delight to a passionate lover, in gently drawing his hand over beauties which he would know again, when illusion, which would act more strongly on the blind than in those who

* The roughness of those new cast, is thought to have assisted him in this distinction.

see, should come to reanimate them; but likewise, the more pleasure such remembrance gave him, the less, perhaps, would his grief be for the loss of the original.

Saunderfon, like the Puifaux blind man, was affected on the least alteration in the atmosphere, and sensible, especially in calm weather, of any objects being near him. It is related of him, that being present at the making some astronomical observations in a garden, the clouds, which now and then intercepted the sun's dyſk, at the ſame time occaſioned ſuch a change in the action of the rays on his face, as ſignified to him the intervals which favoured or impeded the obſervations. You may, perhaps, think, that there was ſome agitation in his eyes, which apprized him of the preſence of light, but not of that of objects. So I ſhould have thought too, were it not certain that Saunderfon was not only blind; but without the very organ of ſight.

Thus Saunderson saw, by means of a pellicle; and of such an exquisite sensibility was this tegument, that a little practice would have brought him to have known an acquaintance, by having his portrait delineated on his hand, and that, by the succession of the sensations excited by the pencil, he would have confidently said, "Oh! this is Mr. such a one." Thus the blind have likewise a painting, in which their own skin serves for the canvas. These ideas are so far from the chimera, that I make no question, were somebody to draw on your hand Mr. ———'s little mouth, you would immediately know it; yet, you must allow, that this would be much easier to one born blind, than to you, though so accustomed to see it and to think it so wonderful pretty. For, your decision implies two or three circumstances; the comparison of the delineation made on your hand, with the picture of it on the ground of your eye; the remembrance of the manner in which we are affected by things felt,
and

and of that with which we are affected by things which we have only seen and admired; lastly, the application of these data to the designer's question, who asks you, with the point of his pencil on the skin of your hand, "Whose mouth is this which I am drawing?" Whereas the sum of the sensations excited by a mouth on the hand of a blind man, is the same as the sum of the successive sensations excited by a designer's pencil.

To this account of the Puisaux blind man and Saunderson, may be added Didymus of Alexandria, Eusebius the Asiatic, and Nicaise of Mechlin, with some others, who appeared so superior to other men, though with one sense less, that the poets might, without exaggeration, have feigned the gods to have deprived them of it from a jealousy lest mortals should equal them. For Tiresius, who had seen into the secrets of the gods, and had the gift of prediction, what was he but a blind philosopher, whose memory has been preserved by fable? But we will keep to the won-

derful Saunderfon, and follow this extraordinary person to his grave.

When drawing near to his end, Mr. Jervis Holmes, a clergyman of great abilities, was desired to attend him. They had a conversation together on the existence of God, some fragments of which are remaining, which I will translate, as well as I can, it being not a little curious.

The clergyman began with haranguing on the wonders of nature. "Ah, Sir," said the blind philosopher to him, "what is all that grand spectacle to me? I have been condemned to spend my life in darkness: you mention wonders quite out of my understanding, and which are proofs only to you, and those who, like you, have their sight. If you would have me believe in God, you must make me feel him."

"Sir," replied the clergyman, very appositely, "feel yourself, and you will meet with the Deity in the admirable mechanism of your organs."

"Mr.

“ Mr. Holmes,” replied Saunderfon,
“ I must repeat it, all that may be very
“ fine to you, yet is not so to me ; but
“ were the animal mechanism as perfect
“ as you make it, and I believe it to be
“ so, for you are a worthy man, and
“ would scorn to impose on me ; what
“ relation is there between such mecha-
“ nism and a supremely intelligent Being ?
“ If it amazes you, it is, perhaps, from
“ your being used to call every thing you
“ cannot directly comprehend, a wonder.
“ I myself have so often been an object of
“ wonder to the world, that I have but a
“ very slender opinion of its wonders.
“ People have come from the farthest
“ part of England to see me, not con-
“ ceiving how I could perform geometri-
“ cal operations. You must allow those
“ people not to have been very exact in
“ their notions of the possibility of things.
“ If a phænomenon appears to us above
“ human comprehension, we immediately
“ say it is the work of God ; nothing less
“ will satisfy our vanity. Would not a

“ little less pride, and a little more philo-
“ sophy, do better in our conversations?
“ If in nature we meet with a difficult
“ knot, let us leave it as it is, and not
“ call in to cut it the hand of a being which
“ afterwards becomes a fresh knot more
“ difficult for us to untie than the former.
“ Ask an Indian how the world remains
“ suspended in the air? He will answer,
“ that it is carried on the back of an ele-
“ phant. And on what does the elephant
“ bear? On a tortoise. And what sup-
“ ports the tortoise?—You pity the In-
“ dian, and one might say to yourself as to
“ him, My good friend Holmes, acknow-
“ ledge your ignorance, and forgive me
“ the elephant and the tortoise.”

Here Saunderson made a little pause, probably expecting an answer from the clergyman; but on which side is a blind man to be attacked! Mr. Holmes availed himself of Saunderson's good opinion of his probity, and of the abilities of Newton, Leibnitz, Clerk, and some others of his countrymen, possibly the first geniusses
of

the world, who all had been stricken with the wonders of nature, and acknowledged an intelligent being as its author. This was undoubtedly the most forcible objection which the clergyman could offer to Saunderson. Accordingly the good blind man allowed that it would be something presumptuous to deny what such a man as Newton had acquiesced in: yet he represented to the clergyman, that Newton's testimony was not of that weight to him, as that of all nature must be to Newton; and that it was on God's word that Newton believed; whereas he was reduced to believe on Newton's word.

“Consider, Mr. Holmes,” added he, “what a confidence I must have in your word and in Newton's. Though I see nothing, I admit that there is in every thing an admirable order; but I promise myself, that you will not require any thing farther. Concerning the present state of the universe, I yield to you; and in return, you will allow me

“ the liberty of thinking as I please on its
“ ancient and primitive state, with relation
“ to which you are as blind as myself. In
“ this you will have no witnesses to bring
“ against me, and your eyes are out of
“ the question. You are therefore wel-
“ come to imagine, that the order which
“ you so highly admire has ever sub-
“ sisted; but allow me to think that it is
“ otherwise, and that if we recurred to
“ the origin of things and times, and
“ that we perceived matter actuated, and
“ the chaos unfolding itself, we should
“ meet with a multitude of informous
“ for a few well-organized beings. If I
“ have nothing to object to you con-
“ cerning the present condition of things,
“ I may at least question you concerning
“ their past conditions. I may, for in-
“ stance, ask you who told you, who told
“ Leibnitz, Clerk, and Newton, that at
“ the primordial formation of animals,
“ some were not without a head, others
“ without legs? I might affirm that
“ some had no stomach, others no bowels;

“ that some species, which, having a sto-
 “ mach, a palate and teeth, seemed like-
 “ ly to last, have failed through some
 “ defect in the heart or the lungs. That
 “ monsters have successively destroyed
 “ each other, that all the faulty combi-
 “ nations of matter have disappeared,
 “ only those remaining, the mechanism
 “ of which was no important contradic-
 “ tion, and which could subsist and per-
 “ petuate themselves.

“ On this supposition, if in the first man
 “ the larynx had been closed, if he had
 “ wanted proper aliments, if the genera-
 “ tive parts had been defectuous, if he had
 “ not met with his mate, or had mingled
 “ within another species, pray, Mr.
 “ Holmes, where would the human spe-
 “ cies have been? It would have been
 “ involved in the general depuration of
 “ the universe, and that haughty being
 “ called man, thus dissolved and scat-
 “ tered among the molecularæ of matter,
 “ would have remained perhaps for ever
 “ in the class of possibility.

“ Had

“ Had there never been any informous
“ beings, you would not fail affirming,
“ that there never will be any, and that
“ I run into chimerical hypotheses; but,”
continued Saunderson, “ amidst all this
“ so perfect order, monstrous productions
“ come forth now and then.” Then
facing the minister, he said, “ Behold
“ me, Mr. Holmes, I have no eyes.
“ What had either you or I done to God,
“ that one should have that organ, and
“ the other be without it.”

Saunderson pronounced these words
with a countenance so earnest and so ex-
pressive of deep concern, that the clergy-
man and the rest of the company could
not forbear participating in his grief, even
to tears. The blind man perceiving it,
said to the clergyman, “ Mr. Holmes,
“ the goodness of your heart was well
“ known to me, and I am very sensible
“ of this fresh proof of it in these my
“ last moments; but if you have any con-
“ cern for me, do not grudge me the
“ com-

“ comfort of dying without having ever
“ caused affliction to any one.”

Then, with something of a more resolute voice, he continued, “ It is therefore my conjecture, that at the beginning, when the fermentation of matter disclosed the universe, such as I were very common. But why should not I affirm of worlds what I believe of animals? How many maimed abortive worlds have been destroyed, or perhaps are continually amended and destroyed, in those remote spaces which I cannot reach, and you do not see; but in which motion continues and will continue to combine masses, till brought to some proper disposition for duration? Come, philosophers, accompany me then to the confines of that universe, beyond that point within which I touch, and you see organized beings; range that new ocean, and amidst its irregular agitations seek some vestiges of that intelligent being, whose wisdom you here so much admire.

“ But

“ But there’s no need of taking you out
“ of your element. Pray, Mr. Holmes,
“ what is this world? Is it not a com-
“ pound subject to revolutions all indi-
“ cating a continual verging to destruc-
“ tion; a rapid succession of beings fol-
“ lowing and propelling one another,
“ and disappearing; a transient symmetry,
“ a momentary order? I was just now
“ taxing you with estimating the perfec-
“ tion of things by your capacity; and
“ here I may find fault with you for mea-
“ suring the duration of them by that of
“ your life: you judge of the world’s
“ successive existence as the ephemeron-
“ fly of yours. This world is eternal to
“ you, just as you are eternal to the being
“ who lives but an instant; and still the
“ insect shews more reason than you.
“ What prodigious series of ephemerons,
“ what immense traditions, bear witness
“ to your eternity? We shall all, how-
“ ever, pass away, without a possibility
“ of denoting the real extent which we
“ took up, or the precise time of our du-
“ ration.

"ration. Time, matter, and space, are
 "perhaps but a point."

During this conversation, Saunderfon became moved something beyond what his condition would bear, that he was seized with a delirium, which lasted for some hours, and on coming to himself he only cried out, "O thou God of
 "Clark and Newton, have mercy on me," and expired*.

Thus died Saunderfon. You see, Madam, that all the reasonings which he objected to the clergyman were not able so much as to fix a blind man. What a shame for those who see, and have no better reasons than he, and to whom the wonderful spectacle of nature, from the rising of the sun to the setting of the smallest stars, declares the existence and glory of its author. They have eyes, which Saunderfon wanted; but Saunder-
 son

* The professor, however, had, according to his life prefixed to his *Algebra*, been so far brought to a sense of Christianity, that a time had been appointed for his receiving the sacrament.

son had a purity of manners, a candour and openness, which they have not. Accordingly, they live as if blind, and Saunderson died as if he had had his sight. The voice of nature made itself sufficiently understood by him, through his remaining organs; and this indeed adds to the force of his testimony against those who obstinately shut their eyes and ears. I would fain ask, whether the darkness of paganism did not shroud the true God from Socrates, more than did the loss of sight, and of the grand spectacle of nature, from Saunderson?

I am very sorry, Madam, that, both for your satisfaction and mine, other interesting particulars of this celebrated blind man have not been transmitted to us. His answers would perhaps have afforded more light than all the experiments proposed to be made. Those about him must have had very little of the philosopher in them, with exception, however, of Mr. William Inchclif, who was with Saunderson only in his last hours, and has preserved for us his

his last sayings, on account of which I would advise all who have any acquaintance with the English to read a work printed at Dublin in 1747, under the title of *The Life and Character of Dr. Nicholas Saunderson, late Lucasian Professor of the Mathematics in the University of Cambridge. By his Disciple and Friend, William Inghelish, Esq;* They will find in it a beauty, a force, and a variety, scarce ever paralleled, but which, with all my care, I do not presume to think my translation has preserved.

In 1713, he married the daughter of Mr. Dickons, rector of Boxworth in Cambridgeshire, by whom he had a son and daughter, still living. His last farewell to his family is very moving. "I am going," said he, "where we shall all go; spare me your lamentations; they affect me too much; your expressions of grief for me sharpen those which escaped me. It is no uneasiness to me to leave a world, which has been only a long desire and one continued deprivation.

" I

“ I wish you all happiness ; live virtuously ; and learn in me to die quietly.” Then taking his wife by the hand, he squeezed it a while between his ; he turned his face towards her, as if desirous of seeing her : after giving his children his blessing, he embraced all his family, and desired them to withdraw, their lamentations being more uneasy to him than the approaches of death.

England is the country of philosophers, virtuosi, and system-makers ; yet had it not been for Mr. Inchclif, we should have known no more of the celebrated Saunderson, than what any common man could have told us, as that he knew again such places where he had once been, by the noise which the walls and the floor reflected, amongst a hundred other such things, all equally common to most blind persons. Are Saundersons then so very common in England ? Does every town there produce persons, who, without ever having their sight, read lectures on optics ?

We

We are curious of seeing sight given to those who were born blind ; but, on farther consideration, philosophy, I believe, would be found rather a greater gainer by questioning a sensible blind man. We should learn the state of things in him ; and could compare them with the state of things within ourselves ; and perhaps we might from this comparison come at the solution of the difficulties which make the theory of vision and of the senses so intricate and so uncertain : But I own I cannot conceive what is to be hoped for from a man who has just undergone a painful operation on a very tender organ, which the slightest accident disorders, and which, when sound, is known to deceive those who had for a long time enjoyed its advantages. For my part, as to the theory of the senses, I had much rather hear a metaphysician, well acquainted with the principles of natural philosophy, the elements of mathematics, and the conformation of the parts, than a man of no education, and void of learning, who has
had

has had his sight restored to him by the cataract-operation. I should lay less stress on the answers of a person seeing for the first time, than on the discoveries of a philosopher who had thoroughly digested his subject in the dark, or, to speak practically, had put out his eyes, to be the better acquainted with vision.

In order to give some certainty to experiments, the subject must at least have been prepared long before, been well educated, and the better, if made a philosopher; but even for a philosopher to make a philosopher, is not the work of an hour; and what will it be, if he be not one? And it is still much worse, if he conceits himself such. The observations should by no means be commenced till long after the operation. In order to this, the patient ought to go through his cure in the dark, till his wound be thoroughly healed, and his eyes entirely sound. I would not have him at first exposed to open day. If our own sight is disordered by the glare of a strong light, what effect

fect will it not have on an organ which cannot but be extremely tender and sensible, having never yet felt any impression to blunt it?

But farther, it would still be a very nice point to reap any benefit even from a subject thus prepared, and to adapt our questions so, that he may precisely say only what passes in himself. This interrogatory should likewise be before the academy; or rather, for avoiding a superfluity of spectators, only such as deserve that distinction by their knowledge in philosophy, anatomy, &c. should be invited to such a meeting. It would be no disparagement to the most profound scholars, or to men of the finest intellects. To prepare and question one born blind, would not have been beneath the combined talents of Newton, Descartes, Locke, Leibnitz.

I shall conclude this letter, which, I own, is already too long, with a question which was proposed some time ago, and which my reflections on Saunderson's singular condition have shewn me to have
never

never been absolutely solved. Suppose one blind from his birth, and grown up to manhood, and who has been taught to distinguish, by his touch, a cube and a globe of the same metal, and nearly of the same bigness, so that when he touches either, he can tell which is the cube, and which the globe. Again, suppose the cube and the globe put on a table, and this blind person is made to see; and the question is, if by seeing them without touching them, he will be able to distinguish them, and tell which is the cube, and which the globe?

This question was first proposed by M. Molineux, who likewise set about solving it. The decision was, that the person would not distinguish the globe from the cube: for, said he, though experience has taught him how the globe and the cube affect his touch, he does not yet know that what affects his touch in such and such a manner must affect his sight thus or thus; nor that the same angle of the cube which presses on his hand
unequally,

unequally, must appear to his eyes as in the cube.

Locke being consulted, said, "I am entirely of M. Molineux's mind. The blind man could not at first sight be able to affirm with any certainty which was the globe and which the cube, if he only viewed them; though by handling them he might confidently name and distinguish them by the difference of their figures, his touch bringing them to his remembrance."

Concerning this question, the Abbé de Condillac, whose *Essay on the Origin of Human Knowledge* you read with so much pleasure and improvement, and whose excellent *Treatise on Systems* accompanies this letter, has a particular opinion. To lay before you the reasons on which he bottoms, would be both needless, and envying you the pleasure of reading over again that work, in which they are set forth in a manner so entertaining and yet so philosophical, as forbids my displacing them. I shall only observe, that they all tend to demonstrate that the person born blind

E

fees

sees not any thing, or sees the sphere and the cube as different ; and that the conditions of these two bodies being of the same metal, and nearly of the same bigness, inserted in the state of the question, are superfluous, which cannot be disputed ; for, he might have said, if there be no essential connection between the sensation of the sight and the touch, as Mess. Locke and Molineux pretend, they must allow that a body may to the eye appear to have two feet diameter, which yet would vanish on being touch'd. The abbé however adds, that if the person born blind sees bodies, discerns their figures, and still hesitates what to think of them, it must be from metaphysical reasons, and those not a little subtle, as you shall presently see.

Thus here are two different opinions on the same question, and between first-rate philosophers. One would think, that after being canvassed by such men as Molineux, Locke and Condillac, nothing more could be said ; but so many are the faces

faces in which the same thing may be viewed, that it is not in the least strange, if they have not drained the subject.

They who declare for the blind man's distinguishing the cube from the sphere, have set out with supposing a fact, which perhaps ought to have been examined; that is, whether a person born blind would be able to make use of his eyes immediately after being couched? All they have said is, "A person blind from his birth, by comparing the ideas of the sphere and cube which he has received from the touch, with those received from sight, will necessarily know them to be the same; that it would be very odd for him to say that the cube gives his sight the idea of a sphere, and the sphere that of a cube; that what by the touch he called sphere and cube, he from the sight will call cube and sphere."

But how do their antagonists argue? They have in like manner supposed, that the person born blind could see immediately after his organ's being restored.

They supposed that an eye couched for a cataract was like an arm recovered from the palsy. "This," say they, "feels without any previous exercise, and consequently the other requires none to see." And they have added, "Let us allow the person who was born blind a little more philosophy than you afford him; and after carrying his reasoning where you left him, he will go on thus: But still who has assured me, that when I have come near to those bodies, and have laid my hands on them, they will not on a sudden deceive my expectation; the cube imparting to me the sensation of the sphere, and the sphere that of the cube? Experience alone can teach me whether there be an analogy between the sight and the touch. These reports of the two senses may be contradictory without my knowing it; nay, I should perhaps believe what is actually before my sight to be only a mere appearance, had I not been informed that they are the very same bodies

"which

“ which I had touched. This indeed
 “ seems to be the body which I called
 “ cube, and this the sphere ; but I am
 “ not asked about what they seem, but
 “ what they are ? and that is a question
 “ which I am in no wise able to an-
 “ fwer.”

This reasoning,” says the author of the
Essay on the Origin of Human Knowledge,
 “ would be very perplexing to him who
 “ had been born blind ; and I see nothing
 “ under experience which can furnish an
 “ answer to it.” The abbé, in all likeli-
 hood, means only that experience which
 the blind man himself would repeat on
 the bodies by a second handling. You will
 soon perceive why I make this remark.
 That able metaphysician might likewise
 have farther added, that in one born
 blind the supposing two senses to be con-
 tradictory should be the less absurd, as he
 conceives that a speculum makes them
 in reality contradictory, as I have noticed
 above.

The abbé proceeds to observe, that M. Molineux has perplexed the question with several conditions, which neither obviate nor remove the difficulties metaphysics would form in one who had been blind from his birth: this observation is the more just, the supposing the blind man acquainted with metaphysics being not at all out of the way; as the experiment in all philosophical questions should be accounted to be made on a philosopher, that is, on a person who, in the questions proposed to him, perceives all that reasoning and the state of his organs allow him to perceive.

This, Madam, is in brief what has been said pro and con on this question; and you shall now see, by my examination of it, how very far they, who determined that the man born blind would see the figures and distinguish the bodies, were from perceiving that they were in the right, and what great reason they who denied it had to think that they were not in the wrong.

The

The question about the man born blind being taken a little more generally than M. Molineux has proposed it, includes two others, which we shall separately consider. It may be asked, 1. Whether he who was born blind will see immediately after his cataracts are couched? 2. Whether, in case he does see, his sight will be such as to distinguish figures; whether, in seeing them, he will be able to give them, with certainty, the same names which he gave them by the touch; and whether he will have any demonstration that these names suit them?

Will he who was born blind see immediately after the cure of the organ? They who hold the affirmative say, "As soon as the blind man comes to the use of his eyes, all the scene before him becomes painted at the bottom of his eye. This image, as consisting of an infinite number of objects, concentrated within a very small space, is but a confused heap of forms which he will not be able to distinguish from one

“ another. Both sides are nearly agreed,
“ that experience alone can teach him to
“ judge of the distance of objects, and
“ that he is even under a necessity of
“ drawing near to them, handling them,
“ removing farther off from them, ap-
“ proaching them, and handling them a-
“ gain, before he is assured that they
“ are not a part of himself; that they
“ are foreign from his essence, and that
“ he is sometimes near, and sometimes
“ at a distance from them. And why
“ should not experience be likewise ne-
“ cessary to him for perceiving them?
“ Without experience, he who perceives
“ objects for the first time should ima-
“ gine, as they are going out of his
“ sight, or he is going from them, that
“ they no longer exist; for it is only ex-
“ perience on permanent objects, and
“ such which we find again in the same
“ place where we left them, which evi-
“ dences and confirms to us the continu-
“ ance of their existence when out of our
“ sight. It may be for this reason, that
“ children

“ children become so soon easy about
 “ their play-things being taken from
 “ them. It cannot be said that they
 “ quickly forget them; for some chil-
 “ dren, at the age of only two years or
 “ two years and a half, know a conside-
 “ rable part of the words of a language,
 “ and they are more at a loss to conceive
 “ them than retain them: now this is a
 “ proof of childhood’s being the very
 “ season of memory. Would it not be
 “ more natural to suppose, that children,
 “ at that time, imagine what they no
 “ longer see, exists no longer, and the
 “ rather, as their joy shews a great mixture
 “ of wonder, on seeing again the objects
 “ which had been taken from them?
 “ Their nurses help them in the notion
 “ of the continuance of absent beings,
 “ by a play, in suddenly hiding one’s
 “ face, and shewing it again. Thus
 “ they experience a hundred times in a
 “ quarter of an hour, that what ceases
 “ to appear, does not therefore cease to
 “ exist. Whence it follows, that to ex-

“ perience, and experience only, we owe
“ the notion of the continued existence
“ of objects ; that it is by the touch we
“ acquire that of their distance ; that
“ the eye, perhaps, learns to see, as the
“ tongue to speak ; that it would not be
“ strange, should the assistance of one of
“ the senses be necessary to another, and
“ that the touch, which ascertains the ex-
“ istence of objects without us, when
“ present to our eyes, is likewise the sense
“ to which the confirmation, not only of
“ their figures, and other modifications,
“ but even of their presence, is reserved.”

To these reasonings are added, Chel-
felden's famous experiments *. The
youth, whose cataracts were couched by
that eminent surgeon, could not, for a
long time, distinguish either dimensions,
distances, situations, or even figures. An
object not above an inch square, being
put before his eye, so as to hide a house
from

* See *The Elements of Newton's Philosophy*, by M.
Voltaire.

from him, seemed to him as large as the house itself. All objects seemed close to his eyes, as the objects of touch to the skin. He could not distinguish what, by means of his hands, he had judged to be round, from what he had conceived to be angular ; nor discern with his eyes, whether what he had felt to be either above or below him, was really above or below. He, at length, but not without great trouble, came to perceive, that his house was larger than his room : but how the eye gave him that idea, he could not conceive. It was not till after many repeated experiments, that he became assured of paintings representing solid bodies ; and when, by viewing of pictures, he was certain that what he saw was not bare surfaces, on putting his hand to a picture, he stood quite amazed at finding only a flat plane, without any prominence. He then asked where the deception lay, in the sight or the touch ? Painting likewise had the same effect on savages. They took the figures for living

men, asked them questions, and were both surprized and affronted at receiving no answer. Now this error in them certainly did not proceed from their not being accustomed to see.

But what can be answered to the other difficulties? That a man's experienced eye does, in reality, shew the objects better than the weak and recent organ of a child, or one born blind, whose cataracts have been just couched. Please, Madam, to consult all the proofs which the abbé de Condillac adduces at the conclusion of his *Essay on the Origin of Human Knowledge*, against the objections of Mr. Cheffelden's experiments, as related by Voltaire. The effects of light on an eye, the first time it is affected with it, and the conditions required in the humours of that organ, the cornea, the crystalline, &c. are specified with great perspicuity and exactness, and leave little doubt but that vision is performed very imperfectly in a child opening its eyes for the first time, or in a blind person just couched.

It

It must therefore be granted; that we should perceive an infinity of things in objects which are unperceived by an infant or one born blind, though these objects be equally painted at the bottom of their eyes; that for objects to strike us is not enough, we must farther attend to their impressions; that consequently, at first using the eyes, one sees nothing; that in the first instants of vision, we feel only a multitude of confused sensations, to the proper discernment of which we are brought only by length of time, and habitual reflection on what passes in us; that it is experience alone which teaches us to compare the sensations with what occasions them; that sensations having no essential resemblance with the objects, it is from experience that we are to inform ourselves concerning analogies, which seem to be merely positive. In a word, that the touch contributes greatly to give the eye an exact knowledge of the conformity of the objects with the representation it receives from

from it, is unquestionable: and I am inclined to think, that were not every thing in nature done by laws infinitely general; if, for instance, the puncture of some hard bodies were painful, and that of other bodies attended with pleasure, we should die before we had collected the hundred-millionth part of the experiments necessary for the preservation of our body and our well-being.

It is, however, by no means my opinion, that the eye cannot instruct itself; or, if I may be allowed the expression, make experiments with itself. For the touch to ascertain to us the existence and the figure of objects, there is no necessity of seeing: and why must we touch, to be assured of the same things by sight? I am no stranger to all the advantages of feeling, nor have I concealed them, in these observations on Saunderson, or the blind man of Puiseaux, but I cannot allow it that prerogative. That the use of one of the senses may be improved and quickened by the observations of the other,

other, is easily conceived; but not that there is an essential dependance between their functions. There are certainly qualities in bodies that we never should perceive without the touch: by the touch we become acquainted with the presence of certain modifications insensible to the eyes, or not perceiving them till informed by that sense; but these services are mutual; and in those whose sight is more sensible than the touch, it is the former of those senses which notifies to the other the existence of objects and modifications, the minuteness of which would escape it. Were a piece of paper, or some other smooth, thin, and flexible substance, put, without your knowledge, between your thumb and fore-finger, it is only your eye which could inform you that the contact of those fingers would not be immediate. Let me cursorily observe, that to deceive a blind man in this would be infinitely more difficult, than imposing upon a person used to see.

A person brought to his sight would certainly be put to no small trouble in acquiring a certainty that external objects are not a part of himself; that he is sometimes near, and sometimes far from them; that they have forms; that some are larger than others; that they have depth, &c. still I make no doubt that at length he will come to see them, and to see them so distinctly as to discern, at least, their more obvious limits. To deny this, would be setting aside the destination of the organs; it would be forgetting the principal phænomena of vision; it would be concealing from one's self that there is no painter of such skill as to come near the beauty and accuracy of the miniatures painted in the bottom of our eyes; that there is nothing more exact than the likeness of the representation to the object represented; that the canvas of this portraiture is not so very small; that there is no confusion among the figures; that they take up about half an inch square; and farther, that nothing is more difficult than

than to explain how the touch would go about teaching the eye to perceive, were the use of this latter organ absolutely impossible without the assistance of the former.

But I, instead of bare presumptions, ask, whether it is the touch which teaches the eye to distinguish colours? I do not think the touch will be allowed so extraordinary a privilege: as granting that, the consequence will be, that one born blind, and just brought to sight, on being shewn a black cube, with a red sphere, on a large white ground, will immediately discern the several limits of those figures.

It may be answered, not before the time necessary to a suitable arrangement of the humours of the eye, for the cornea to mould itself into the convexity requisite for vision; for the pupil to be susceptible of the dilatation and contraction proper to it; for the reticles of the retina to become of a sensibility adapted to the action of light; for the crystalline to ex-
ercise

ercise itself in its forward and backward motions; for the muscles to perform their functions well; for the optic nerves to be habituated in transmitting sensations; for the whole ball of the eye to accommodate itself to all the necessary dispositions; and for all the parts composing it to concur in the execution of that miniature which so much illustrates the demonstration, that the eye will bring itself to the requisite experience.

I own that, plain as the picture is which I have now represented to the eye of one born blind, he will not be able thoroughly to distinguish its parts till the organ comes to have all the preceding conditions; that this possibly may be instantaneous; and by applying the reasoning objected to me, to a machine a little complicated, as a watch, it would not be difficult to demonstrate by the detail of the several motions in the drum, the fuzee, the wheels, the pallats, the balance, &c. that the hand would take up a fortnight in moving the space of a second. If it
be

be answered, that these motions are simultaneous, I reply, that possibly it may be the same with those of the eye when opened for the first time, and of most of the consecutive judgements. Whatever conditions be required in the eye to be fit for vision, it must be granted, that it is not the touch which imparts them to it; that the organ acquires them of itself, and consequently will come to distinguish the figures painted in it without the assistance of any other sense.

But it will be farther said, when will it attain such improvement? Perhaps much sooner than is thought. Do you remember, Madam, the experiment of the concave speculum, when I had the honour of attending you to the Museum in the king's garden, and the fright you was in at seeing the point of a sword making at you with the same swiftness as the point of that which you pushed towards the surface of the speculum? and yet you was sufficiently accustomed to refer objects painted in the speculums to something beyond

yond them. Experience, therefore, is not so very necessary, nor even so infallible as imagined, for perceiving objects or their images where they are. Your very parrot affords me a proof of it. The first time he saw himself in a glass, he stretched his head towards it, and not meeting with himself, whom he took for his representation, he went round the glass. Though I am not for laying greater weight on the instance of the parrot than it will really bear, still is it an animal experiment, in which prepossession cannot be supposed to have any share.

Yet were it affirmed to me, that one born blind is not able to distinguish any thing for the space of two months, I should not wonder at it. I shall only infer from it the necessity of the organs being experienced; but not at all that the touch is necessary to that experience. It will only give me the better to see the propriety of letting such a person remain for some time in the dark, when it is intended he should make observations; of giving

giving his eyes a freedom of exercise, which will be done more conveniently in the dark than in a full light; of shewing him the experiments only in a kind of twilight; or, at least, of procuring, in the place for making the experiments, the advantage of increasing or diminishing the light at pleasure. I shall only be the more inclined to agree, that these kind of experiments will be always very difficult, or very uncertain; and that the shortest way to rectify them, though in appearance the longest, is to furnish the subject with so much philosophy as to be able to compare the two conditions through which he has passed; and to acquaint us with the difference between the state of a blind person, and of him who has his sight. Once more, what precision is to be expected from one not at all accustomed to reflect and look into himself, and who, like Chesselden's blind man, is so ignorant of the advantages of sight, as to have no sense of his misfortune; not conceiving that the loss of that sense very much impairs

pairs his gratifications? Saunderfon, who must be allowed to have been a philosopher, certainly was not thus indifferent; and I doubt much whether he would have agreed with the author of the excellent treatise on systems. I am apt to think the latter of these philosophers has himself slipped into a little system in advancing, “ That
“ had the life of man been only an uninter-
“ rupted sensation of pleasure or of pain,
“ happy without any idea of calamity, or
“ wretched without any idea of happiness, he would have enjoy’d or suffer-
“ ed; and that, as if such had been his
“ nature, he would not have looked
“ around to discover whether any being
“ superintended his preservation, or strove
“ to hurt him. So that it is the alterna-
“ tive transition from one to the other of
“ these states which puts him on reflect-
“ ing, &c.”

Can you believe, Madam, that by a progression from clear perceptions to clear perceptions (for that is the author’s method of philosophizing, and it is the best)

best) he would have ever been led to this conclusion? It is not with happiness and misery as with darkness and light; one does not consist in a total and absolute privation of the other. Perhaps we should have entertained a persuasion of happiness being no less essential to us than existence and thought, had we enjoyed it pure and without restraint; but I cannot say so much of wretchedness. It would have been very natural to look on it as a forced state, to feel one's self innocent, yet to believe one's self guilty, and to accuse or excuse nature as at present.

Does the abbé think that a child in intense pain cries only from his pain not having been without intermission since his birth? If he answers me, "That to exist and
" suffer would be the same thing to one
" who had always suffered; and that his
" pain allowed of intermission without
" destroying his existence, would never
" have come into his thoughts:" I reply, The man living in continual misery possibly might not have said, What have

I done, that I should suffer thus? But why might he not have said, What have I done, that I should be brought into being? Yet I see not why he might not have made use of the two verbs, *I exist* and *I suffer*, as synonymous, one for prose and the other for poetry, like *I live* and *I breathe*. You will, moreover, Madam, observe better than I, that this passage of the abbé's book is so admirably beautiful, and I am very much afraid, that on comparing my criticism with his reflection, you will say: You like Montaigne in the wrong better than Charon in the right.

What, ever digressing! you cry out. Yes, Madam, our treaty allows it. Now my opinion on the two foregoing questions is this: the first time the eyes of one born blind open to the light, he will have no perception of any thing; his eye will require some time for experience, but that it will acquire of itself, and without any help from the touch; and it will come not only to distinguish colours, but discern, at least, the grosser limits of objects.

jects. Let us now see whether, supposing he acquired this aptitude in a very short time, or arrived at it by moving his eyes in the dark apartment to which he had been prudently confined, and desired to use that exercise for some time after the operation, as preparatively to the experiments; let us, I say, see whether his sight would indicate to him the bodies which he had touched, so as to give them their proper appellations? This is the final question.

That my manner of performing it may please you, as you love method, I will distinguish several sorts of persons on whom the experiments may be tried. If they are dullards, without education, void of knowledge, and unprepared, I hold, that on the organ being rectified by the cataract operation, and the eye healed, the portraiture of objects in it will be very distinct; but such persons not being used to any kind of reasoning, and not knowing any thing of sensation or idea, and unable to compare the representations

F received

received by feeling, with those which the eye conveys to them, will at once say, that is round, that is square, so that their judgement is not to be rested on; or even they will frankly own that they do not perceive any thing in the objects before their eyes, like what they have handled.

Others there are, who comparing the apparent figures of bodies with the impressed ones made on their hands, will, by an ideal application of their feeling to those bodies before them, say of one, that it is a square, and of another, that it is a circle, without well knowing why, their comparison of the ideas which they have received from the touch, with those given them by the light, not being clear and distinct enough to convince their judgement.

I shall now, Madam, without any digression, suppose the experiment made on a Metaphysician. He, I make no doubt, would, from the very first instant of his perceiving objects distinctly, reason as if he had seen them all his life;
and

and after comparing the idea received from his sight, with those he had imbibed from feeling, he would declare, as positively as you or I, "I am very much inclined to think this the body which I have always called a circle, and that again what I named a square, but will not assert it to be really so. Who has revealed to me, that if I laid my hands on them, they would not vanish? How do I know whether the objects of my sight are intended to be likewise objects of my feeling? I know not whether what is visible be palpable; but were I not under this uncertainty, and did I firmly believe on the word of those about me, that what I see is really what I touched, I should be little the better. They may change in my hands, and thus the ideas by feeling be quite opposite to those resulting from sight. Gentlemen, would he add, "this body appears to me the square, this the circle; but that they are to the

F 2

" feeling

“ feeling as to the sight, is what I have
“ no knowledge of.”

If to the Metaphysician we substitute
a Geometrician, as Saunderfon to Locke,
he will, like him, say, “ That if his eyes
“ may be relied on, of the two figures
“ before him, this is what he called a
“ square, and this a circle; for I per-
“ ceive,” would he add, “ that it is only
“ in the first I can dispose the threads
“ and place the large headed pins which
“ denoted the angular points of the
“ square; and it is only the round which
“ admits of the arrangement of my
“ threads, used in demonstrating the pro-
“ perties of my circle: so, therefore,
“ that is a circle, and that is a square;
“ but would he with Locke have proceed-
“ ed? On my beginning to feel these
“ figures, they may perhaps transform
“ themselves into each other, so that
“ the same figure would serve me
“ in demonstrating to the blind the pro-
“ perties of a circle, and to those who
“ have their sight the properties of a
2. “ square.

“ square. I might possibly see a square,
 “ and at the same time feel a circle.
 “ They, to whom I demonstrated the
 “ properties of a circle and of a square,
 “ had not their hands on my *Abacus*,
 “ nor did they touch the threads which
 “ I had stretched along as the limits of
 “ my figures, yet did they comprehend
 “ me; they therefore did not see a square,
 “ when I felt a circle, otherwise we should
 “ never have understood one another: I
 “ should have been delineating one figure,
 “ and demonstrating the properties of
 “ another; I should have given them a
 “ straight line for the arch of a circle, and
 “ an arch of a circle for a straight
 “ line; but as they all understand me,
 “ all men then see alike; therefore,
 “ what they saw square, I saw such,
 “ and circular what they saw circular;
 “ so, that is what I have always named
 “ a square, and that is what I have al-
 “ ways named a circle.”

I have instead of a sphere put a circle,
 and a square instead of a cube; because.

in all appearance, it is only by experiment that we come to judge of distances, and of course, he who uses his eyes for the first time, sees only surfaces, without knowing any thing of projecture; the projecture of a body to the sight, consisting in some of its points, appearing more to us than the other.

But could a person born blind determine concerning the projecture and solidity of bodies, at the first view of his eyes, and be able to distinguish not only the circle from the square, but likewise the sphere from the cube; yet do I not therefore think that this will hold good with regard to more complicated objects. M. de Reaumur's girl, who had been born blind, did very probably distinguish colours; but it is great odds that her judgement of the sphere and the cube was purely guess-work; and I am firmly persuaded, that without a revelation, it was not possible for her to know her gloves, her bed-gown, and shoes. The modifications are so multifarious,

rious, and the total form of them so little agreeing with that of the parts which they cover, that Saunderson would have been infinitely more puzzled to find out the use of his square, than M. d'Alembert, or M. Clairaut, in decyphering the use of his tables.

Saunderson would infallibly have supposed a geometrical relation between things, and the use of them; and in consequence have perceived in two or three analogies, that his cap was made for his head. But what would he have thought of the angles and tuft of his trencher cap? What can this tuft be for? Why four angles rather than six? And those two modifications, which to me are matters of ornament, would to him have been the source of a multitude of absurd reasonings, or rather an occasion of excellent satyr on what we term good taste.

Things duly considered, it will be owned, that the difference between a person who has always seen, but to whom

the use of an object is unknown, and one who knows the use of an object, but who has never seen, is not on the side of the latter; yet, do you think, Madam, that were a head-dress to be shewn you to-day for the first time, you would ever guess it to be a part of dress, and particularly intended for the head? But if it be the more difficult for one born blind, and seeing for the first time, to judge rightly of objects, the more forms and modifications they have, why might he not take a spectator quite dressed, and sitting motionless in an elbow chair, for a piece of furniture, or a machine; and a tree with its boughs and leaves shaken by the wind, for a self-moving, animated, and thinking being? How many things our senses suggest to us, Madam; and were it not for our eyes, how apt should we be to suppose that a block of marble thinks and feels!

It remains then to be proved, that Saunderfon would have been certain of his not being mistaken in the judgement

ment he had just given only of the circle and the square; and that there are cases when the reasoning and experience of others may assist sight, concerning the relation of the touch, and convince it, that what a thing is to the eye, it is likewise so to the touch.

It would, however, be not the less essential in the demonstration of some propositions of eternal Truth, as they are termed, to try one's demonstration by depriving it of the testimony of the senses; for you are very well aware, Madam, that would any one go about proving to you, that the projection of two parallel lines on a plane is to be made by two convergent lines, because two rows of trees appear such, it would be forgetting that the proposition is as true for one that is blind, as for himself.

But the preceding supposition of one born blind suggests two others: one of a man, who has had his sight from his birth, but without ever having the sense of feeling; and the other of a man in

whom the sight and touch were in perpetual contradiction. The former might be asked, whether if the sense he wants were given to him, and his sight be precluded by a fillet over his eyes, he should know bodies by the feeling? It is evident that geometry, provided he was acquainted with it, would furnish him with an infallible way for being certain whether the testimonies of the two senses be contradictory or not. It would be only taking the cube or the sphere into his hands, demonstrate its properties, and, if understood, pronounce, that what he feels to be a cube, is seen to be a cube, and that consequently what he holds is a cube. As to one who is a stranger to that science, I believe that he would not more easily discern the cube from the sphere by touch, than M. Molineux's blind man distinguish them by the sight.

As to him in whom the sensations of sight and of feeling are in a perpetual contradiction, I know not what he would think of forms, order, symmetry, beauty, deformity,

mity, &c. He would, in all likelihood, be, with regard to those things, as we are with regard to the extension and real duration of beings. He would, in general, determine that a body has a form; but he must be inclined to think that it is neither that which he sees, nor that which he feels. Such a one might be displeased with his senses, but the senses would be neither pleased nor displeased with the objects. Were he disposed to charge one of them with deception, I fancy it would fall on the touch. A hundred circumstances would bias him to think that the figure of objects changes rather by the action of his hands on them, than by that of the objects on his eyes. But in consequence of these prejudices, the difference of hardness and softness, which he would find in bodies, would put him to no small perplexity. But from our senses not being in contradiction concerning figures, does it therefore follow that they are better known to us? Who has told us that we

have not to do with false witnesses ? yet we pronounce sentence. Alas ! Madam, when human knowledge comes to be put in Montaigne's scale, we are ready to adopt his motto, " For what do we know ? What matter is ? No. What spirit and thought is ? Still less. What motion, space, and duration are ? Not in the least. What geometrical truths are ? Ask any honest mathematicians, and they will own to you, that their propositions are all identical, and that so many volumes, for instance, on the circle, amount to no more than repeating to us, in a hundred thousand different ways, that it is a figure in which all the lines drawn from the center to the circumference are equal.*" Thus we scarce know any thing : yet,

* A blind man, moving in the sphere of a mathematician, seems a phenomenon difficult to be accounted for : Tully mentions it as a thing scarce credible in his own master in philosophy, Diodorus, " That he exercised himself in philosophy with more assiduity after he became blind ; and what he thought next to impossible, to be done without
" sight,

yet, what numbers of writings! the authors of which have all pretended to knowledge. I cannot account for the world's not being tired of reading, and learning
nothing,

“ sight, that he professed geometry, describing his
“ diagrams so expressly, that his scholars drew every
“ line in its proper directions.”

St. Jerom relates a more remarkable circumstance in Didymus of Alexandria, who, “ though blind
“ from his infancy, and therefore ignorant of the
“ very letters, not only learnt logic, but geometry
“ also to perfection, which seems the most of any
“ thing to require the help of sight.”

Trithemius, de Scriptoribus Eccles. mentions Nicaise de Voerde, at Mechlen, “ who, though
“ blind from the first year of his age, became so
“ eminent in learning, that he taught the canon and
“ civil law in the university of Cologne, and quoted
“ books only from having heard them read to him.”

I have further heard of a Hollander, and some others, whom blindness did not hinder from excelling in mathematical learning. Indeed, if we consider that the ideas of extended quantity, which are the chief objects of mathematics, may as well be acquired from the senses of feeling, as that of sight; that a firm and steady attention is the principal qualification for this study; and that the blind are necessarily
more

110 L E T T E R, - &c.

nothing, unless it be for the very same reasons as I have been talking to you for these two hours, without being tired, and without saying any thing to you. I am, with great respect,

Madam,

Your most humble,

And most obedient Servant,

* * * *

more abstracted than others; we shall perhaps find reason to think there is no other branch of science more adapted to their circumstances. *Life of Saunderson, prefixed to his Algebra.*

Professor Saunderson could spell very well; he knew the shapes of the letters, both small and capital, and would sometimes amuse himself, when opportunity offered, with reading inscriptions on tombstones with his fingers. He frequently regretted his not applying himself to learn to write in his younger years, which he made no question he could have easily accomplished. *Biographical Dictionary.*

R E M A R K-

REMARKABLE
C A S E S
O F
BLINDNESS.

An account of observations made by a young gentleman who was born blind, or lost his sight so early that he had no remembrance of ever having seen, and was couched when between thirteen and fourteen years of age. From Mr. Cheselden.

THOUGH we say of this gentleman that he was blind, as we do of all people that have ripe cataracts, yet they are never so blind from that cause but they can discern day from night, and, for the

the most part, in a strong light, distinguish black, white, and scarlet, but they cannot perceive the shape of any thing; for the light, by which these perceptions are made, being let in obliquely through the aqueous humour, or the anterior surface of the crystalline, that the rays cannot be brought into a focus upon the retina; they can discern in no other manner, than a sound eye can see through a glass of broken jelly, where a great variety of surfaces so differently refract the light, that the several distinct pencils of rays cannot be collected by the eye into their proper foci; wherefore the shape of an object in such a case cannot be at all discerned, though the colour may: and thus it was with this young gentleman, who, though he knew these colours asunder in a good light, yet, when he saw them after he was couched, the faint ideas he had of them before, were not sufficient for him to know them by afterwards, and therefore he did not think them the same, which he had before known by those names. Now scarlet he thought

thought the most beautiful of all colours, and of others the most gay were the most pleasing; whereas the first time he saw black, it gave him great uneasiness, yet after a little time he was reconciled to it; but some months after, seeing by accident a negroe woman, he was struck with great horror at the sight.

When he first saw, he was so far from making any judgement about distances, that he thought all objects whatever touched his eyes (as he expressed it), as what he felt did his skin, and thought no object so agreeable as those which were smooth and regular, though he could form no judgement of their shape, or guess what it was in any object that was pleasing to him: he knew not the shape of any thing, nor any one thing from another, however different in shape or magnitude; but upon being told what things were, whose form he before knew from feeling, he would carefully observe, that he might know them again; but having too many objects to learn at once, he forgot many of them, and (as he

he said) at first he learned to know, and again forgot a thousand things in a day. One particular only, though it may appear trifling, I will relate: having often forgot which was the cat and which the dog, he was ashamed to ask, but catching the cat, which he knew by feeling, he was observed to look at her stedfastly, and then setting her down, said, "So, puss, I shall know you another time." He was very much surprized that those things, which he had liked best, did not appear most agreeable to his eyes, expecting those persons would appear most beautiful, that he loved most, and such things to be most agreeable to his sight, that were so to his taste. We thought he soon knew what pictures represented, which were shewed to him, but we found afterwards we were mistaken; for about two months after he was couch-ed, he discovered at once they represented solid bodies, when to that time he considered them only as party-coloured planes, or surfaces diversified with variety of paint; but even then he was no less surprized, expect-

expecting the pictures would feel like the things they represented, and was amazed when he found those parts, which by their light and shadow appeared now round and uneven, felt only flat like the rest, and asked, which was the lying sense, feeling or seeing?

Being shewn his father's picture in a locket at his mother's watch, and told what it was, he acknowledged a likeness, but was vastly surprized; asking, how it could be, that a large face could be expressed in so little room? Saying, it should seem as impossible to him, as to put a bushel of any thing into a pint.

At first he could bear but very little sight, and the things he saw, he thought extremely large; but upon seeing things larger, those first seen he conceived less, never being able to imagine any line beyond the bounds he saw; the room he was in, he said, he knew to be but part of the house, yet he could not conceive that the whole house could look bigger. Before he was couched, he expected little
advan-

advantage from seeing, worth undergoing an operation for, except reading and writing; for, he said, he thought he could have no more pleasure in walking abroad, than he had in the garden, which he could do safely and readily. And even blindness, he observed, had this advantage, that he could go any where in the dark, much better than those who can see; and after he had seen, he did not soon lose this quality, nor desire a light to go about the house in the night. He said every new object was a new delight; and the pleasure was so great, that he wanted words to express it; and his gratitude to his operator he could not conceal, never seeing him, for some time, without tears of joy in his eyes, and other marks of affection: and if he did not happen to come at any time when he was expected, he would be so grieved, that he could not forbear crying at his disappointment. A year after first seeing, being carried upon Epsom Downs, and observing a large prospect, he was exceedingly delighted with it, and called it a new kind of
of

of seeing. And now being lately couched of his other eye, he says, that objects at first appeared large to this eye, but not so large as they did at first to the other; and looking upon the same object with both eyes, he thought it looked about twice as large as with the first couched eye only, but not double, that we can any ways discover.

I have couched several others who were born blind, whose observations were of the same kind; but they being younger, none of them gave so full an account as this gentleman.

*Observations on Mr. Blacklock, who lost
his sight in his infancy.*

IT is indeed true that Homer, the most celebrated poet of antiquity, and Milton, who is without a rival among the moderns, were both blind. But Milton was not blind till he was fifty years old, and Homer, for aught we know, not till after he had written his Iliad and his Odyfsey; and it is not strange that their power of recollecting, combining, and expressing ideas, which had been perceived and treasured in their minds, when they could see, should be increased when they became blind, as they were able to exert more intellectual force upon any certain object, when every other was excluded. Blacklock's peculiarity as a poet is, that he was blind almost from his birth, and how he, who can have no conception of any ideas that depend upon sight, should be able to express them, not only intelligibly, but with propriety; how he should be able to heighten description, and decorate sentiment

timent with figures and metaphors, which depend not only upon vision in general, but all the particular phænomena of visible objects, is most astonishing.

Mr. Spence observes, in a short account just published of Mr. Blacklock's life, writings, and character, that his notions of day may comprehend the ideas of warmth, variety of sounds, society, and chearfulness; and his notions of night the contrary ideas of chillness, silence, solitude, melancholy, and, occasionally, even of horror: that he substitutes the idea of glory for that of the sun; and of glory, in a less degree, for those of the moon and stars. That his ideas of the beams of the sun may be composed of this idea of glory, and that of rapidity; that something of solidity too may perhaps be admitted, both into his idea of light and darkness, but that what his idea of glory is, cannot be determined. Mr. Spence also remarks, that Blacklock may attribute paleness to grief, brightness to the eyes, chearfulness to green, and a glow to gems, and roses, without

without any determinate ideas; as boys at school, when in their distress for a word, to lengthen out a verse, they find *purpureus olor*, or *purpureum mare*, may afterwards use the epithet *purpureus* with propriety, though they know not what it means, and have never seen either a swan or the sea, or heard that a swan is of a light, and the sea of a dark colour. But he supposes too that Blacklock may have been able to distinguish colours by his touch, and to have made a new vocabulary to himself, by substituting tangible for visible differences, and giving them the same names; so that green with him may mean something pleasing or soft to the touch, and red something displeasing or rough. In defence of this supposition it may be said with some plausibility, that the same disposition of parts in the surfaces of bodies, which makes them reflect different rays of light, may make them feel as differently to the exquisite touch of a blind man. But there is so much difference in the tangible qualities
of

of things of the same colour, so much roughness and smoothness, harshness and softness, arising from other causes, that it is more difficult to conceive how that minute degree, arising from colour, should be distinguished, than how a blind man should talk sensibly of the subject, without having made such distinction. We cannot conceive how a piece of red velvet, woollen cloth, camblet, silk, and painted canvass, should have something in common, which can be distinguished by the touch, through the greatest difference in all qualities which the touch can discover, or in what mode green buckram should be more soft and pleasing to the touch than red velvet. If the softness peculiar to green be distinguished in the buckram, and the harshness peculiar to red in the velvet, it must be by some quality with which the rest of mankind are as little acquainted, as the blind with colour. It may perhaps be said, that a blind man is supposed to distinguish colours by his touch, only when all other things are e-

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qual:

qual : but if this be admitted, it would as much violate the order of his ideas to call velvet red, as to call softness harsh, or indeed to call green red; velvet being somewhat soft and pleasing to the touch, and somewhat soft and pleasing to the touch, being his idea of green.

But whatever be his mode of perception, he has used the names of mere visible qualities with the utmost propriety, through all their combinations and diversities of appearance.

*An account of some astonishing particulars
that happened to a lady, after her having
had the confluent kind of the small-pox.*

IN the course of this disease, during which the lady was attended by the late Sir Hans Sloan, several threatening symptoms appeared, which, however, were at length overcome; and the patient, being thought out of danger, took several doses of such purgative medicines as are usually administered in the decline of the disease, without any bad consequence.

But in the evening of the day on which she had taken the last dose that was intended to be given her on that occasion, she was suddenly seized with pains and convulsions in the bowels; the pain and other symptoms became gradually less violent, as the force of the medicine abated, and by such remedies as were thought best adapted to the case, they seemed at length to be entirely subdued.

They were, however, subdued only in appearance; for at eleven o'clock in the forenoon of the next day, they returned with great violence, and continued some hours: when they went off, they left the muscles of the lower jaw so much relaxed, that it fell down, and the chin was supported on the breast. The strength of the patient was so much exhausted during this paroxysm, that she lay near two hours with no other sign of life than a very feeble respiration, which was often so difficult to be discerned, that those about her concluded she was dead.

From this time, the fits returned periodically every day, at about the same hour. At first they seemed to affect her nearly in the same degree, but at length all the symptoms were aggravated, the convulsions became more general, and her arms were sometimes convulsed alternately: it also frequently happened, that the arm which was last convulsed remained extended and inflexible some hours after the struggles were over. Her neck was often twist-
ed

ed with such violence, that the face looked directly backwards, and the back part of the head was over the breast : the muscles of the countenance were also so contracted and writhed by the spasms, that the features were totally changed, and it was impossible to find any resemblance of her natural aspect by which she could be known. Her feet were not less distorted than her head, for they were twisted almost to dislocation at the instep, so that she could not walk but upon her ancles.

To remove or mitigate these deplorable symptoms, many remedies were tried, and, among others, the cold bath ; but either by the natural effect of the bath, or by some mismanagement in the bathing, the unhappy patient first became blind, and soon after deaf and dumb. It is not easy to conceive what could increase the misery of deafness, dumbness, blindness, and frequent paroxysms of excruciating pain ; yet a considerable aggravation was added, for the loss of her sight, her hearing, and her speech, was followed by such a stricture of

the muscles of the throat, that she could not swallow any kind of aliment, either solid or liquid. It might reasonably be supposed that this circumstance, though it added to the degree of her misery, would have shortened its duration; yet in this condition she continued near three quarters of a year, and during that time was supported, in a very uncommon manner, by chewing her food only, which having turned often, and kept long in her mouth, she was obliged at last to spit out. Liquors were likewise gargled about in her mouth for some time, and then returned in the same manner, no part of them having passed the throat by an act of deglutition; so that whatever was conveyed into the stomach, either of the juices of the solid food, or of liquors, was either gradually imbibed by the sponginess of the parts, which they moistened, or trickled down in a very small quantity along the sides of the vessels.

But there were other peculiarities in the case of this lady, yet more extraordinary. During the privation of her sight
and

and *hearing*, her *touch* and her *smell* became so exquisite, that she could distinguish the different colours of silk and flowers, and was sensible when any stranger was in the room with her.

After she became blind, and deaf, and dumb, it was not easy to contrive any method by which a question could be asked her, and an answer received. This however was at last effected, by talking with the fingers, at which she was uncommonly ready. But those who conversed with her in this manner, were obliged to express themselves by touching her hand and fingers instead of their own.

A lady, who was nearly related to her, having an apron on that was embroidered with silk of different colours, asked her, in the manner which has been just described, if she could tell what colour it was ? and after applying her fingers attentively to the flowers of the embroidery, she replied, that it was red, and blue, and green ; which was true ; but whether there were any other colours in the apron, the writer

of this account does not remember. The same lady having a pink-coloured ribbon on her head, and being willing still farther to satisfy her curiosity and her doubts, asked what colour that was? her cousin, after feeling some time, answered, that it was pink colour; this answer was yet more astonishing, because it shewed not only a power of distinguishing different colours, but different kinds of the same colour: the ribbon was discovered not only to be red, but the red was discovered to be of the pale kind, called a pink.

This unhappy lady, conscious of her own uncommon infirmities, was extremely unwilling to be seen by strangers, and therefore generally retired to her chamber, where none but those of the family were likely to come. The same relation, who had by the experiment of the apron and ribbon discovered the exquisite sensibility of her *touch*, was soon after convinced by an accident, that her power of *smelling* was acute and refined in the same astonishing degree.

Being

Being one day visiting the family, she went up into her cousin's chamber, and after making herself known, she entreated her to go down, and sit with the rest of the family, assuring her, that there was no other person present; to this she at length consented, and went down to the parlour door; but the moment the door was opened, she turned back, and retired to her own chamber, much displeased, alledging, that there were strangers in the room, and that an attempt had been made to deceive her. It happened, indeed, that there were strangers in the room, but they had come in while the lady was above stairs; so that she did not know they were there. When she had satisfied her cousin of this particular, she was pacified; and being afterwards asked how she knew there were strangers in the room, she replied, by the smell.

But though she could by this sense distinguish, in general, between persons with whom she was well acquainted, and strangers, yet she could not so easily distinguish

one

one of her acquaintance from another, without other assistance. She generally distinguished her friends by feeling their hands, and when they came in they used to present their hands to her, as a means of making themselves known: the make and warmth of the hand, produced, in general, the differences that she distinguished; but sometimes she used to span the wrist and measure the fingers. A lady, with whom she was very well acquainted, coming in one very hot day, after having walked a mile, presented her hand, as usual; she felt it longer than ordinary, and seemed in doubt whose it was; but after spanning the wrist, and measuring the finger, she said, "It is Mrs. M. but she is warmer to-day than ever I felt her before."

To amuse herself in the mournful and perpetual solitude and darkness, to which her disorder had reduced her, she used to work at her needle; and it is remarkable that her needle-work was uncommonly neat and exact. Among many other pieces
of

of her work that are preserved in the family, is a pin-cushion, which can scarce be equalled. She used also sometimes to write, and her writing was yet more extraordinary than her needle-work; it was executed with the same regularity and exactness; the character was very pretty, the lines were all even, and the letters placed at equal distances from each other; but the most astonishing particular of all, with respect to her writing, is, that she could by some means discover when a letter had by mistake been omitted, and would place it over that part of the word where it should have been inserted, with a *caret* under it. It was her custom to sit up in bed at any hour of the night, either to write or to work, when her pain or any other cause kept her awake.

These circumstances were so very extraordinary, that it was long doubted whether she had not some faint remains both of hearing and sight, and many experiments were made to ascertain the matter; some of these experiments she accidentally discovered,

ed, and the discovery always threw her into violent convulsions. The thought of being suspected of insincerity, or supposed capable of acting so wicked a part as to feign infirmities that were not inflicted, was an addition to her misery which she could not bear, and which never failed to produce an agony of mind not less visible than those of her body. A clergyman, who found her one evening at work by a table with a candle upon it, put his hat between her eyes and the candle, in such a manner that it was impossible she could receive any benefit from the light of it, if she had not been blind. She continued still at work, with great tranquillity, till putting up her hand suddenly to rub her forehead, she struck it against the hat, and discovered what was doing; upon which she was thrown into violent convulsions, and was not without great difficulty recovered.

The family were, by these experiments, and by several accidental circumstances, fully convinced that she was totally
deaf

deaf and blind, particularly by her sitting unconcerned at her work, during a dreadful storm of thunder and lightning, though she was then facing the window, and always used to be much terrified in such circumstances. But Sir Hans Sloan, her physician, being still doubtful of the truth of facts, which were scarce less than miraculous, he was permitted to satisfy himself by such experiments and observations as he thought proper; the issue of which was, that he pronounced her to be absolutely deaf and blind.

She was at length sent to Bath, where she was in some measure relieved, her convulsions being less frequent, and her pains less acute; but she never recovered her speech, her sight, or her hearing, in the least degree.

Many of the letters, dated at Bath, in some of which there are instances of interlineations with a *caret*, the writer of this narrative hath seen, and they are now in the custody of the widow of one of her brothers, who, with many other persons,
can

334 CASES OF BLINDNESS.

can support the facts here related, however wonderful, with such evidence as it would not only be injustice, but folly, to disbelieve.



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IV.

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